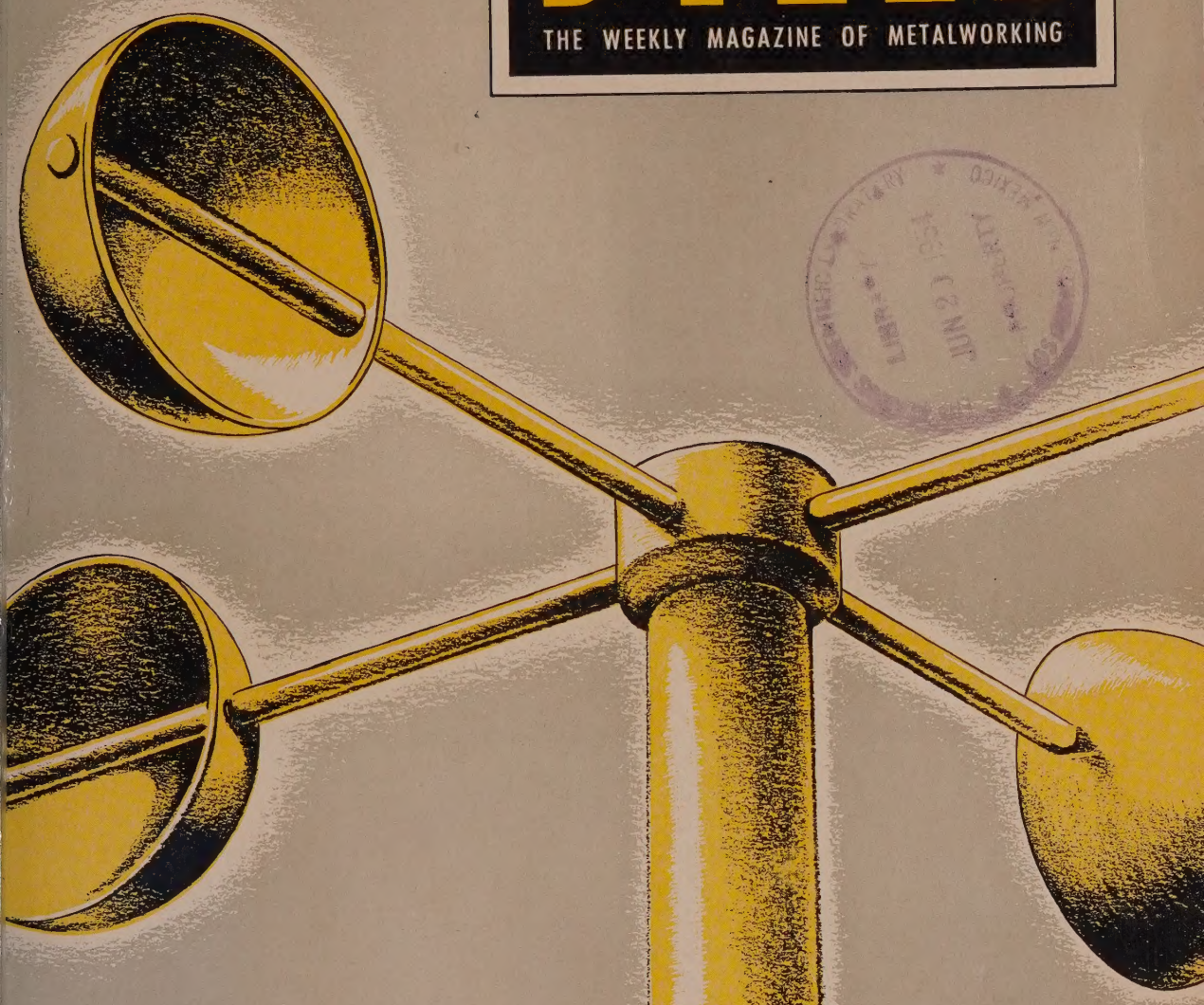
JUNE 28, 1954

STEEL

THE WEEKLY MAGAZINE OF METALWORKING



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Midyear Forecast:

TRADE WINDS STRONGER

STEEL's readers tell why — p. 55

✓ **CONSIDER PRECIPITATION-HARDENING STAINLESS**
It Fabricates Easily, Heat-Treats Readily, p. 100

✓ **TOOLING UP FOR ALUMINUM CUTTING**
Right Shape Extends Speed Limit, p. 116

CONTENTS — PAGE 5

TUBING MACHINABILITY

Machinability of tubing is vitally important to producers of hollow cylindrical parts. But in the last analysis, final production *cost* is the real determining factor. Consequently, choosing the mechanical tubing that will easily machine to the quality finished part you demand and also hold final cost to the minimum, requires careful consideration of all the factors involved.

Matching the tubing to your own product needs and production equipment is important. Getting — in the tube — as many as possible of the characteristics and properties desired in the finished part, is equally important. Finish, heat treatment, tolerances, steel quality, alloy factor—any or all of these can be supplied within the original B&W mechanical tubing, to either eliminate or to reduce your machining and other production operations.

Because B&W mechanical tubing is tailor-made to suit your combination of production conditions and product specifications, you win on all counts. You'll find that the machining characteristics of the B&W tubing you select make it particularly suitable for your type of machine tool. Since you start with the desired properties, your production time and costs are pared to the bone.

B&W Regional Sales Offices, together with a nationwide network of B&W Distributors, are always prepared to serve you. You'll find Mr. Tubes — your link to B&W—always available to provide unbiased assistance in meeting your specific mechanical tubing requirements.

THE BABCOCK & WILCOX COMPANY
TUBULAR PRODUCTS DIVISION
Beaver Falls, Pa.— Seamless Tubing; Welded Stainless Steel Tubing
Alliance, Ohio — Welded Carbon Steel Tubing

B&W SEAMLESS and WELDED TUBES

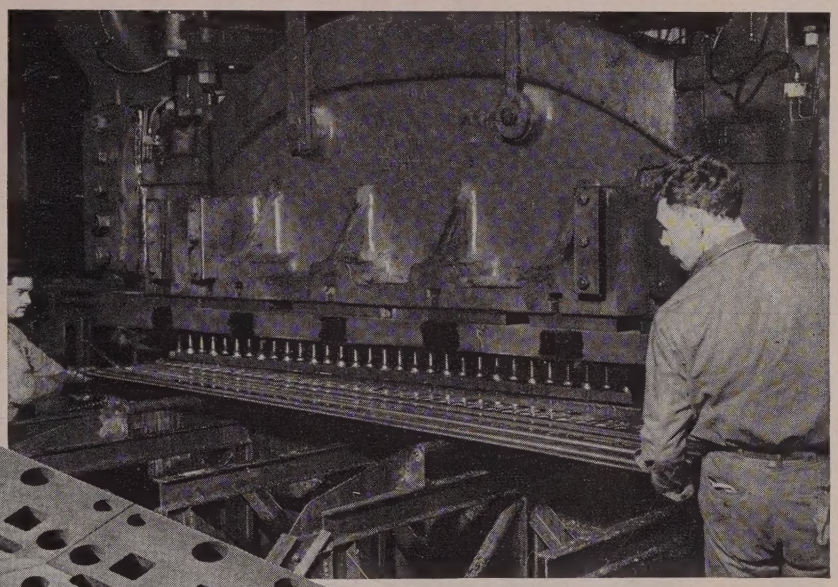
TA-4025(M)

Tool Steel Topics

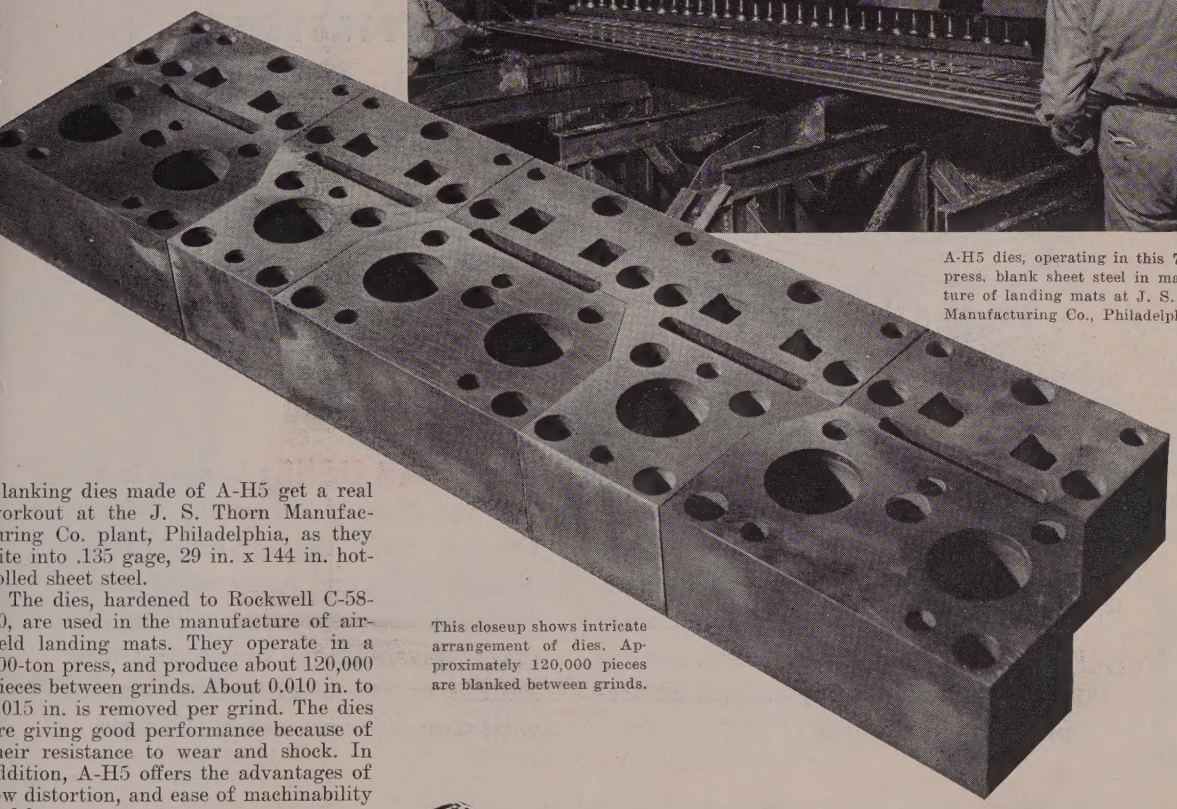
BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

e Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

Dies of A-H5 ve Good Service n Turning Out Landing Mats



A-H5 dies, operating in this 700-ton press, blank sheet steel in manufacture of landing mats at J. S. Thorn Manufacturing Co., Philadelphia.



This closeup shows intricate arrangement of dies. Approximately 120,000 pieces are blanked between grinds.

lanking dies made of A-H5 get a real orkout at the J. S. Thorn Manufacuring Co. plant, Philadelphia, as they ite into .135 gage, 29 in. x 144 in. hotolled sheet steel.

The dies, hardened to Rockwell C-58-0, are used in the manufacture of airield landing mats. They operate in a 00-ton press, and produce about 120,000 ieces between grinds. About 0.010 in. to 015 in. is removed per grind. The dies re giving good performance because of heir resistance to wear and shock. In ddition, A-H5 offers the advantages of w distortion, and ease of machinability nd heat treatment.

A-H5 is our 5-pct-chrome air-hardenng tool steel. It's an easy tool steel to achine, too, as it can be annealed to 12 Brinell.

Typical Analysis

Carbon	1.00	Molybdenum	1.10
Manganese	0.60	Vanadium	0.25
		Chromium	5.25

-H5 is an economical steel for dies, unches, and forming and blanking tools. is well liked wherever safe hardening, w distortion and increased resistance wear are required. Why not give it a ial? Your nearest Bethlehem tool-steel istributor can supply you promptly.

BETHLEHEM TOOL STEEL ENGINEER SAYS:

Avoid Premature Failure—Don't Make Shock Tools Too Hard

As a rule, shock-resisting tool steels perform best when they are hardened to Rockwell C-55/C-60. At such a range, there's a good compromise provided between toughness and resistance to wear. When premature failure occurs in these grades, it can usually be traced to excessively high hardness.

But rather than harden shock-resisting steels to Rockwell C-59 or higher, when such hardnesses are required, it would be better to select a carbon tool steel.

When greater wear-resistance is required, the chrome-tungsten grades of shock-resisting tool steel may be carburized to provide a hard case and a shock-resisting core. The carburized case used for this type of shock-resisting steel should be only 0.010 deep. This method can be used to good advantage when you are manufacturing such items as reamers, swaging dies and master hobs.

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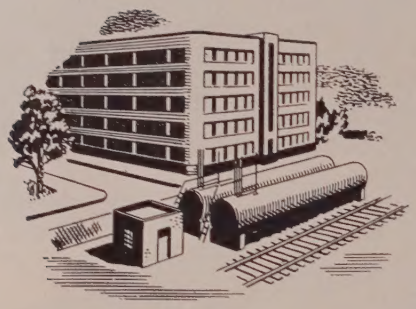
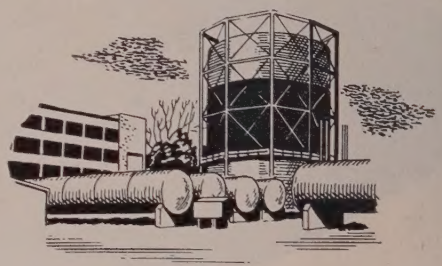
PHILGAS*!

CLEAN, UNIFORM HEAT FOR INDUSTRIES AND UTILITIES





PHILGAS BENEFITS: This top-quality Phillips *66* butane-propane fuel is uniform in thermal value and gravity. Free from harmful contaminants, it burns *clean!* Automatic operation cuts down on overhead, assures constant furnace temperatures, atmospheres and pressures.

PHILGAS USES: Leading industries use Philgas successfully for heat treating, mold drying, core baking, ceramic firing and many other operations. Many progressive utilities also find it advantageous to augment their natural or manufactured gas output with clean-burning, reliable Philgas.

*Philgas is the Phillips Petroleum Company trademark for its high quality propane-butane LP-Gas or bottled gas.

Phillips 66 Philgas
THE ALL-PURPOSE FUEL

PHILLIPS PETROLEUM COMPANY

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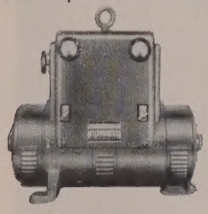
Offices located in Amarillo, Tex., Atlanta, Ga., Chicago, Ill., Denver, Colo., Des Moines, Ia., Pontiac, Mich., Indianapolis, Ind., Kansas City, Mo., Milwaukee, Wis., Minneapolis, Minn., New York, N. Y., Omaha, Nebr., Raleigh, N. C., St. Louis, Mo., Tulsa, Okla., Wichita, Kans.

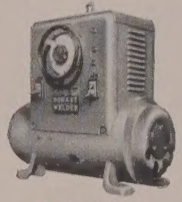
Try! Compare

. . . the new HOBART Arc Welders

. . . and you'll see why you get more actual benefits in dollar savings and INCREASED PROFITS! HOBART'S outstanding design and special features bring higher performance, faster welding and lower cost operation in a compact and easy to move unit.



For Automatic Welding

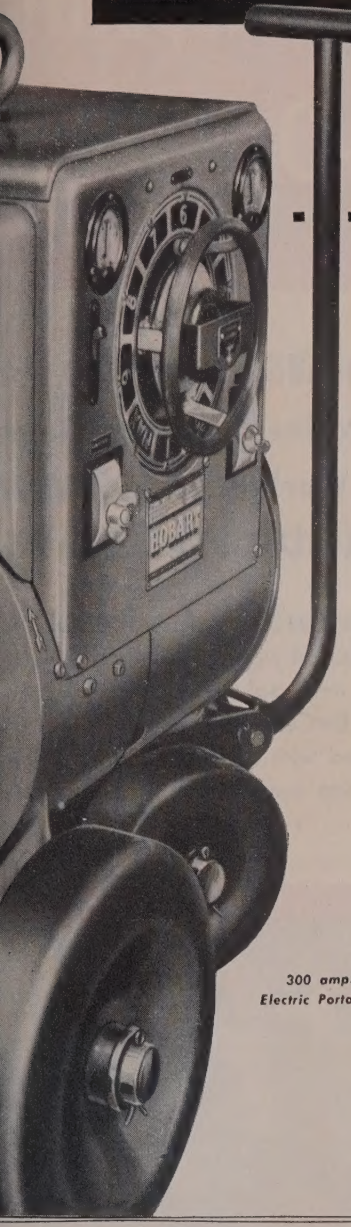


Bantam Champ

AC Transformer Welders

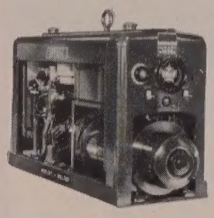
For Faster Production

Hobart welders will do your production work better and faster. They're available in 200, 300, 400 and 600 ampere sizes to do any job—light or heavy. An on the job comparison will prove their value . . . job after job you'll see Hobart outperform other welders, saving time and cutting production costs.

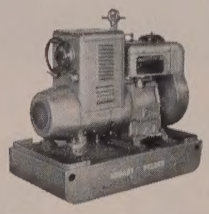


300 amp. Electric Portable

300 amp. Gas Engine Drive



250 amp. "Pipeliner"



200 amp. Gas Engine Drive

For Repair and Maintenance

For repair and maintenance work Hobart offers a wide range of welders in electric motor driven or gas engine drive—air or water cooled—portable or stationary. Now you can have AC welding and AC power for repair or construction jobs away from power lines—may also be used as an emergency power source. Find out how you can get better, lower cost welding by mailing the attached coupon . . . no obligation, of course.

BART electrodes

m . . . a comparison will prove you
t more top quality welding per day.
electrodes are made for every
ation of AC or DC welding. Tell us
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s for you to try!

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"One of the world's largest builders of arc welding equipment"

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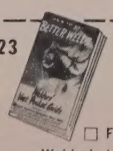


☐ FREE Welder's Vest Pocket Guide

Samples to be used on (type of work) _____

NAME _____ POSITION _____

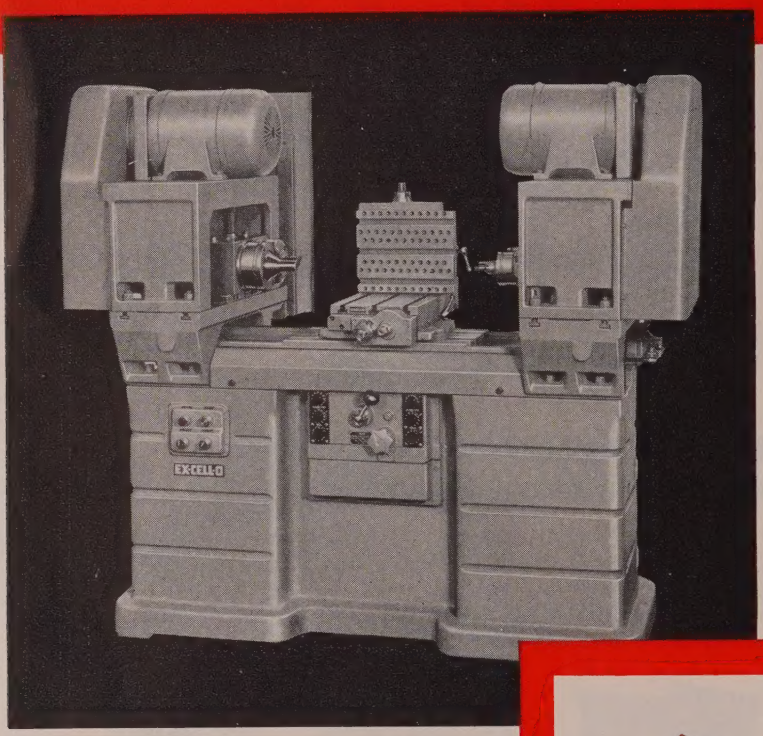
FIRM _____

ADDRESS _____

HOBART TROY OHIO WELDERS

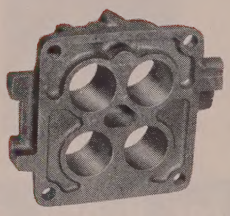
HOBART WELDERS; ELECTRODES

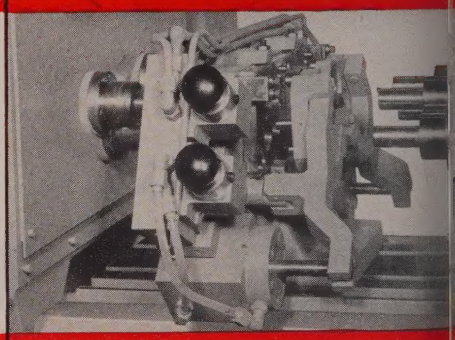
To Meet Today's Price-Competition Modernize with Ex-Cell-O Machines



Standard Precision Boring Machines for Close-Toleran Work at MAXIMUM PRODUCTION SPEED

Style 1212-A Precision Boring Machi equipped with spindles, drive mechanis and universal fixture. Like all other Stan ard Ex-Cell-O Boring Machines, it can tooled with special fixtures for high pr duction runs.





TYPICAL TOOLING: Cast-iron body-flanges for a new 4-barrel automotive carburetor require accurate bores. The four holes are 1⅜" diameter, *bored to plus-or-minus .0005".* It's done at *maximum production speeds* on this standard double-end Ex-Cell-O 1212-A Precision Boring Machine using a simple fixture holding two parts.

Ask your local Ex-Cell-O representative for more information or write for Precision Boring Catalog.

XLO
EX-CELL-O for PRECISION

The four holes are so close together th they cannot be bored simultaneous So two holes in each part are machin by spindles at left; then, two holes each by spindles at right. With min changeovers, this same fixture handl similar parts of different shapes.

EX-CELL-O CORPORATION
DETROIT 32, MICHIGAN

MANUFACTURERS OF PRECISION MACHINE TOOLS • GRINDING SPINDLI CUTTING TOOLS • RAILROAD PINS AND BUSHINGS • DRILL JIG BUSHING AIRCRAFT AND MISCELLANEOUS PRODUCTION PARTS • DAIRY EQUIPMEN

54-13

This Week in Metalworking

STEEL
THE WEEKLY MAGAZINE OF METALWORKING

Vol. 134 No. 26 June 28, 1954

✓NEWS ✓PRODUCTION-ENGINEERING ✓MARKETS

☑ **Metalworking Outlook** 47

As the Editor Views the News 51

Mid-Year Report 55
STEEL's forecast for the metalworking industry in the next six months

Windows of Washington 62

Outlook for Centralized Lubricating Systems 66
Sales are back to normal. Unlimited supply will bring fierce competition

So You're Having a Company Picnic 67

Mirrors of Motordom 69

The Business Trend 73

Men of Industry 77

☑ **Technical Outlook** 99

Precipitation Hardening 100
Part I. How to work stainless the easy way: Work in received condition, then harden to minimize distortion

Below Zero Heat Treatment 104
Process is being used on a production basis for a number of applications: Normalizing castings, shrink fitting etc.

Progress In Steelmaking 111
New Exothermic Technique for Pouring Ingots—Process reduces feeding factor, cost; increases furnace output

How To Tool Up for Aluminum Cutting 116
An expert gives tips on how to tool up for cutting aluminum at top speeds and feeds of the machines

Dissimilar Metals Can Be Flash Welded 132
Proved with ferrous and some nonferrous metal combinations, new tools, methods weld copper to aluminum

New Products and Equipment 135

☑ **The Market Outlook** 149
Metal Prices and Composites begin on Page 150

Nonferrous Metals 152

Behind the Scenes	6	Foreign News	65
Letters to the Editors	10	Obituaries	83
Calendar of Meetings	27	Helpful Literature	144

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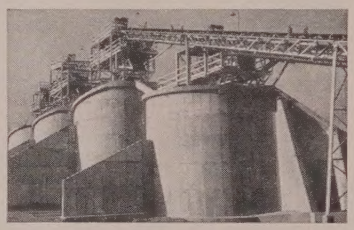
(Advertisement)

what's NEW in Engineering

A new free-hand electric bandsaw is said to cut through metals "like a knife through butter". It is light enough (16 pounds) to be used free-hand in any position, and the power driven unit is claimed to be the first completely portable unit of its kind. Slightly larger than a hand hacksaw, it is about 15 times faster.

On Puget Sound at Steilacoom, Kaiser Engineers designed and recently completed one of the nation's most modern aggregates plants to supply the growing demand for sand and gravel in the Pacific Northwest. A unique feature of the plant's



construction was the erection of serpentine walls in the sand and gravel storage areas to eliminate dead space. The new plant's flexibility of operation is such that it not only can handle most common sizes of gravel, but also any other specific sizes ordered by customers. Its crushing and screening capacity is 375-500 tons per hour.

Conditioning of Water for Industrial Use is the title of a new book, written by Sheppard T. Powell being published by McGraw-Hill this month.

This modern guide to water conditioning describes the various types of apparatus in detail, including design features, control required for efficient performance, cost of installation and operation and other pertinent information.

Whether it's designing an oil refinery, building a manufacturing plant or laying out a plant site, Kaiser Engineers undertakes the job with assurance because of the variety of talent within the organization. Successful experience in a wide field of design, engineering and construction tells the story. Call or write: Kaiser Engineers, Division of Henry J. Kaiser Company, Kaiser Building, Oakland 12, California.

behind the scenes

Babies Bring Business

Did you see where Mort Weisinger, in his June 13 article in *This Week* Magazine, borrowed a page from Walt Campbell's editorial in the Jan. 5 STEEL?

Mr. Weisinger called his article "The Baby Boom." Campbell called his "Babies Bring Business." Both authors agree that babies could be our new weapon against depression.

The gloom-forecasters' warnings of hard times are being drowned out by a mighty chorus of 4 million squalling babies each year. Here are some of the ways these men believe our infant crop is bringing joy to American industry:

Mr. Weisinger says, "This population explosion, which shows no sign of abating, is bringing dividends to millions of Americans, from baby sitters to builders. Translated into bread-and-butter terms, it means that the stork will literally keep the wolf from the door."

Campbell brings the problem closer to metalworking when he says, "Last year the per capita expenditures for the products of metalworking were about $788, based on $126.6 billion sales and a 160 million population.

"In 1947, per capita expenditures for metalworking products were $470 in terms of 1953 dollars. The annual average gain in constant dollars over the seven-year period was more than $45.

"If we assume this rate of increase will continue to 1960, the per capita expenditures for metalworking products then would be $1103 and total metalworking sales would be $198 billion.

"If we carry the projection to 1975, per capita expenditures for metalworking products would be $1778 and total metalworking sales would be $355 billion in terms of constant 1953 dollars."

Do these figures appear fantastic? If they do, take a look at what happened to total metalworking sales since 1939 when they were $17.6 billion. This growth represents a three-fold increase in constant dollars in 15 years.

So you see the great baby boom could well be the lubricant which will help keep America's industry humming in high gear.

Today's cap-pistol set graduates will one day be the adult consumers of America. Envision if you can a 35-million human sinking fund which we can tap for continuing "good times" in years to come. Are you looking ahead to your share of this dynamically growing market?

How's Your Distribution?

We heard an address recently by peppery Robert Nelson, president of Lanston Monotype, in which he laid the blame for any recession in this country and bad general economic conditions abroad on maldistribution. This he claims, is the direct result of "mismarketing."

Here is an authority who believes that management, all too often, looks at advertising as a pimple on the face of distribution. He cited the case of his own company which lost sales and prestige through neglect of its sales promotion activities—and advertising in particular.

Mr. Nelson is one more voice added to the chorus demanding more and better information on how to improve distribution practices. You'll find the June, July and August installments in STEEL's 1954 Program for Management discussing the many facets of this extremely timely and always important subject.

Please tell us how you like them.

Shrdlu

(Metalworking Outlook—Page 47)

At Pennsylvania Railroad's New Ore Pier

Super Highway for Ore

Designed, Fabricated and Erected by

Heyl+Patterson

The modern conveying, car loading and weighing facilities at the new Pennsylvania Railroad Greenwich Point, South Philadelphia, Ore Pier provide speed, efficiency and, above all, flexibility to handle any unloading situation without delay at the new pier.

Each of the 54" wide, high tension, *steel cord* belt conveyors stretches from the tip of the pier to the car-loading house some 1600 feet away. And each belt is capable of carrying ore at the rate of over 3000 tons per hour (ultimate capacity 5400 tons).

The horizontal portions of both conveyor belts are equipped with impact idlers and are designed for loading at any point.

In the car-loading house both conveyors can discharge ore, by means of tilting stoneboxes, into either of two 600-ton capacity bins. These bins will discharge automatically-controlled amounts of ore into 4 scale-mounted hoppers which will load cars on two tracks.

This arrangement will permit the handling of two entirely different ores simultaneously without difficulty or confusion.

This smooth-working, efficient ore handling system illustrates the ability of Heyl & Patterson to design and build conveying equipment to meet specific requirements.

Have a Heyl & Patterson engineer help you with your Heavy Bulk Materials Handling problem.

High Lift-Turnover-Rotary Railroad Car Dumpers
Boat Loaders and Unloaders
Ore Bridges
Coal Handling Equipment
Pig Iron Casting Machines
Cyclone Thickeners
Thorsten Coal Samplers
Car Hauls and Boat Movers
Coal Crushers
Bradford Breakers

Heyl+Patterson, Inc.

"SINCE 1887"

55 FORT PITT BLVD. PITTSBURGH 22, PA.

AT U. S. STEEL'S FAIRLESS WORKS:

3 UNIQUE BLISS COLD MILL INSTALLATIONS

Three interesting rolling mills catch a visitor's eye at the Fairless Works: the big, fast Two-Stand Tandem Mill that temper rolls tin plate; the Two-High Mill built right into the Wean pickling line to pulverize oxide on the hot rolled strip and thereby speed pickling; and another Two-High Mill in the Wean Shearing line which tempers, trues-up and flattens strip—eliminating extra handling steps.

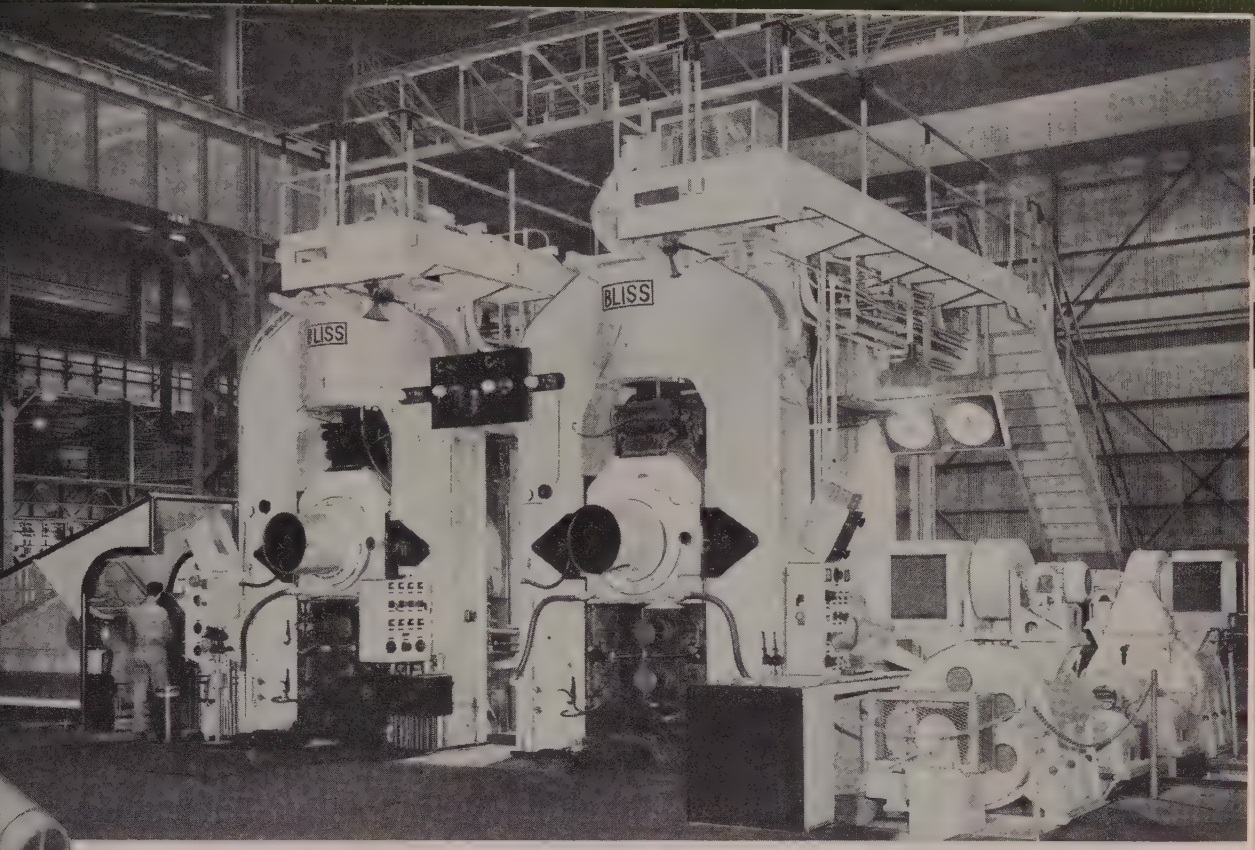
Each of the mills is Bliss-Built—all are the result of close cooperation between Bliss rolling mill engineers and U. S. Steel's top engineers and operating men. And each of the three mills encompasses the most advanced thinking in design, material handling and instrumentation for speed, safety and quality control. If you'd like to see other examples of modern Bliss rolling mill equipment and accessories, write for a copy of our new 60-page Rolling Mill Brochure today. Ask for catalog 40-A.

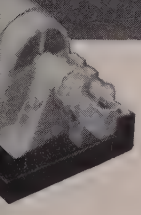
E. W. BLISS Company
General Office: Canton, Ohio

BLISS
SINCE 1857

ROLLING MILL DIVISION: SALEM, OHIO

Remember: BLISS for Presses, ROLLING MILLS, Special Machinery

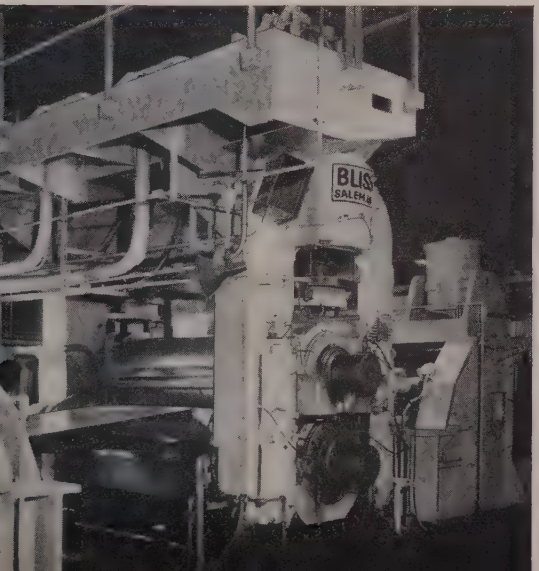


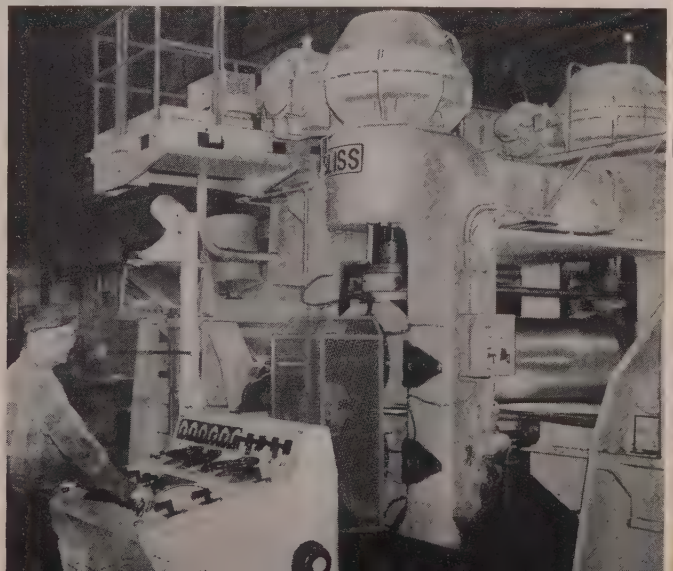


1 TEMPERS TIN PLATE AT 3700 FPM. This 19″ and 53″ x 48″ Bliss Two-Stand Tandem Mill tempers tin plate in gages from 0.007 in. to 0.015 in. to a width of 36 inches. (It can, however, roll up to 44-in. width maximum, if needed.) Motorized conveyors feed coils into and away from the mill, eliminating handling and minimizing stock damage. In line with latest design trends, all driven rolls are *individually motorized* (left) including cone payoff reel, auxiliary tension rolls and tension winder. This arrangement results in lower inertia factors for accelerating and decelerating, plus other advantages. On roll drives, special "thrust pedestal stand bearings" are provided to protect drive motors in roll changing.

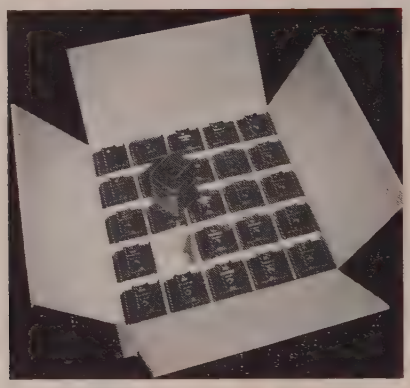
A NEW DEVELOPMENT IN STEEL MILLS is this 32″ x 80″ Bliss Two-High Mill, an integral part of the pickling line at Fairless. In a use unique to the steel industry the mill gives the strip a light reduction, shapes it and pulverizes its tight oxide (formed with the rapid cooling which follows hot rolling), thereby making the material easier to pickle. The entire pickling operation is speeded and tonnage is boosted considerably.

3 IN THE SHEARING AND SLITTING LINE is this 32″ x 80″ Bliss Two-High Mill—where it tempers and flattens the strip prior to shearing. Representing the latest design in this type of mill, it has complete controls and a special DC motor drive to supply the necessary wide range of speeds. By using the mill in this way, U. S. Steel completely eliminated an extra handling operation, which is so important to its high quality-control standards.

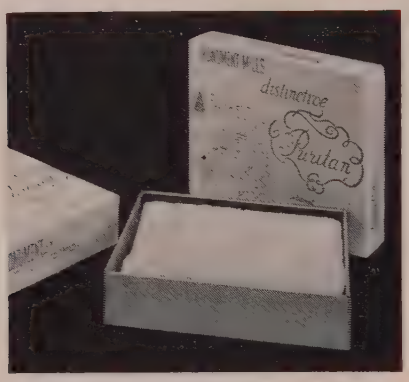




CREATE **INTEREST**



SHIP WITH **SAVINGS**



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Write for free booklet "How to Prepak in Corrugated Boxes."
Hinde & Dauch, Sandusky 47, Ohio

LETTERS
TO THE EDITORS

Look to Export Markets

It was gratifying to read your article "Export Trade—It's Industry's Job Now" (May 31, p. 50). Through articles such as this the business community may gradually come to realize that if we wish to maintain a healthy, dynamic and expanding domestic economy, we have no other recourse than to develop new markets abroad.

Much of the information contained in the "do's" and "don'ts" on establishing overseas operations of your article was taken directly from a study made by the U. S. Council's Committee on Foreign Establishments. This study, published as a booklet titled "Doing Business Abroad," was designed to set forth basic considerations that must be taken into account by any organization contemplating international business operations.

We regret that no mention was made of this booklet, for we still have a limited supply in stock and would be pleased to supply copies to any of your readers requesting them.

John I. Shields
United States Council
International Chamber of Commerce Inc.
New York

Gage Is One of Its Kind

In "Mirrors of Motordom" (Apr. 26, p. 70), you make reference to a machine which measures the thickness of dead-soft strip copper to .0001-inch at the rate of 300 feet per minute without touching the copper.

We are interested in securing information on this machine and wonder if you would give us the name of the manufacturer who makes it.

K. E. Yeager
production superintendent
Young Radiator Co.
Racine, Wis.

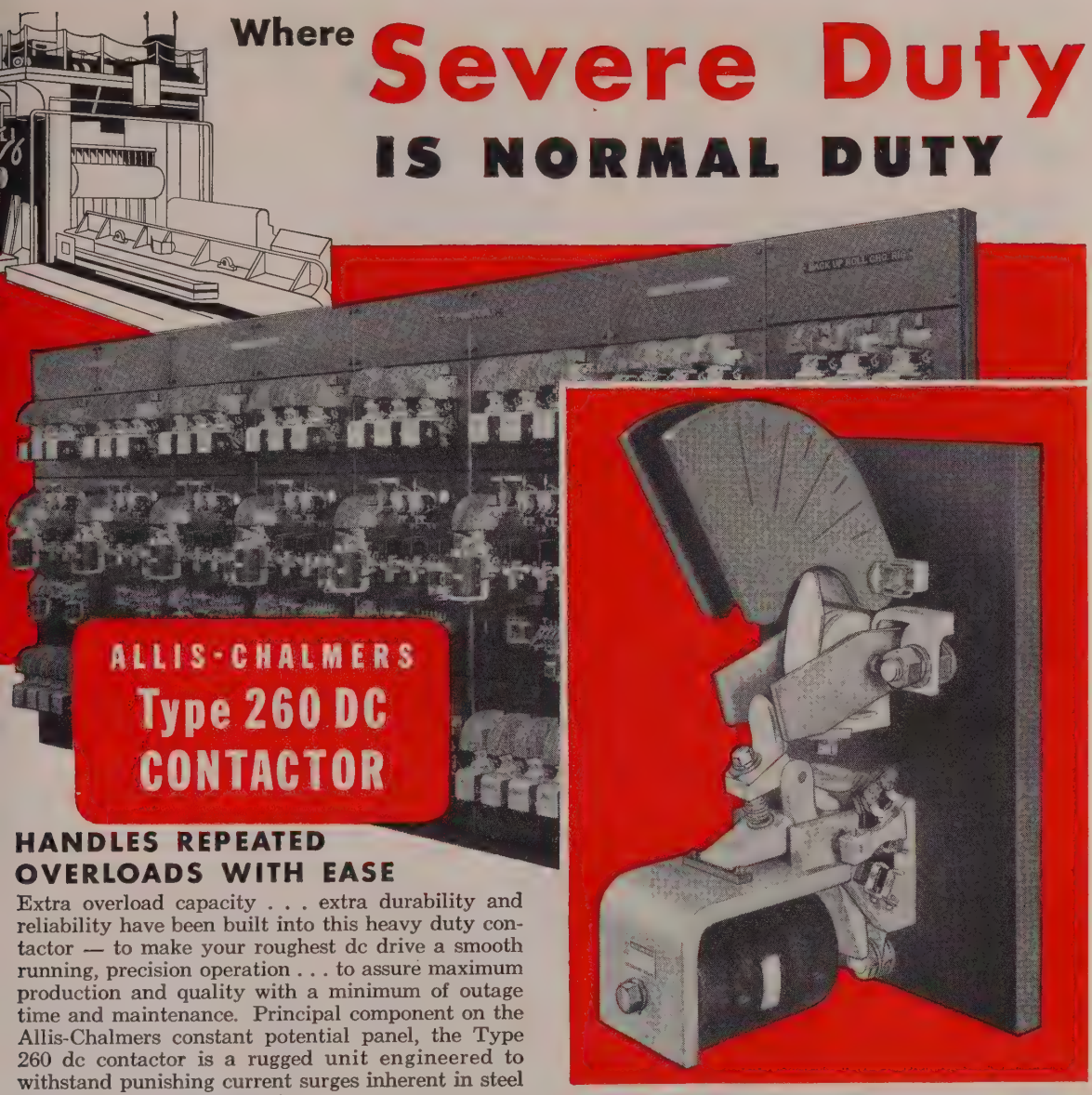
• *The electronic copper-gaging machine to which you refer was made at the Process Development Section, General Motors Corp. To our knowledge only one such machine has been built and that was built in the Process Development Section itself. For further information, write Glen R. Fitzgerald, Process Development Section, General Motors Corp., Detroit 2.—ED.*

Broad Statement Challenged

In the article, "Plating Nickel on Aluminum" (May 24, p. 115), the subheading states, "Everyone recommended copper or cadmium, but Ford Instrument Co. uses a new system successfully . . ." I think the statement is rather broad and should not include Enthone Inc., which has been engaged in selling

(Please turn to page 12)

Where Severe Duty IS NORMAL DUTY



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Type 260 DC
CONTACTOR

HANDLES REPEATED OVERLOADS WITH EASE

Extra overload capacity . . . extra durability and reliability have been built into this heavy duty contactor — to make your roughest dc drive a smooth running, precision operation . . . to assure maximum production and quality with a minimum of outage time and maintenance. Principal component on the Allis-Chalmers constant potential panel, the Type 260 dc contactor is a rugged unit engineered to withstand punishing current surges inherent in steel mill auxiliary drive operation.

Here's Why!

● **Quick quenching minimizes contact burning** — Arc centering blowout uses thermal convection and magnetic action to stretch, cool and extinguish arc. Rapid circuit interruption minimizes burning and pitting of contacts.

● **All current-carrying parts silver to silver** — Main contacts are high density forged copper, plated with silver for dependability and extended life. Auxiliary contacts are solid silver . . . need no dressing.

● **Magnet coil designed for continuous duty at 110% of rating** — Coil layer wound with insulation between layers . . . vacuum impregnated to resist moisture and abuse. Operates contactor at less than 80% of rated voltage when hot. Holds at 20% of normal voltage.

● **Other features.** Rolling contact action. Arc handled on tips, current on clean heels . . . no destructive scuffing. Design simplicity eliminates troublesome linkages, arms and pivots. Lifetime *Oilite* shaft bearings need no lubrication. A-4326

SIMPLIFIED ROUTINE INSPECTION

Keeping the Type 260 contactor in top operating condition is merely a matter of preventive maintenance through routine inspection. All components are readily accessible. Arc chute lifts off to expose contacts which may be removed by loosening one bolt. Auxiliary contacts are mounted on contactor frame in full view. Operating coil is held by a single bolt.

For complete information, call your nearby Allis-Chalmers representative or write Allis-Chalmers, Milwaukee 1, Wisconsin.

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with exact moisture control

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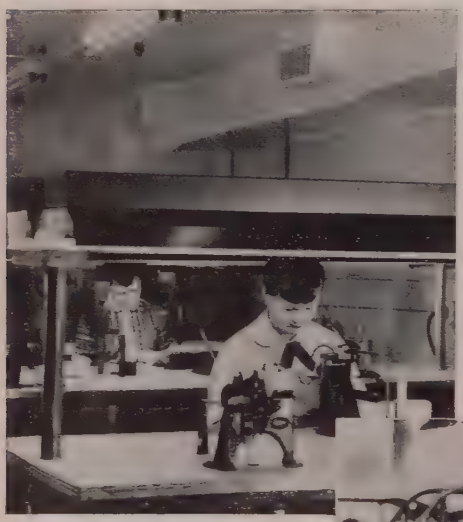

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EASIEST TO TAKE CARE OF. The machine is accessible, the control circuits are simple and easy to operate, and there are no solids, salts or solutions to be handled.

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Niagara District Engineers in Principal Cities of U. S. and Canada

LETTERS

(Concluded from page 10)

processes for electroplating upon aluminum for many years.

We have consistently recommended nickel in most cases in favor of copper, cadmium or other metals when soldering must be done. In our operating instructions, we state on p. 4, "The best metal to deposit upon aluminum for soldering is nickel."

Walter R. Meyer
Enthone Inc
New Haven, Conn.

● *You're right, the statement is too broad. By "everyone" we meant everyone concerned with this particular decision at Ford Instrument Co.—ED.*

Government Pay: High or Low?

Your "Windows of Washington" for Mar. 8 (p. 80), titled "Federal Salaries: Comparable to Private Pay Except for Top Men," is interesting but not true.

Recently Wright-Patterson Air Force Base, Dayton, O., publicized the fact that it was in the process of conducting an intense recruitment campaign for stenographers. Advertising was placed in surrounding states in an attempt to meet a crucial shortage. Does this indicate that federal salaries are comparable to those in private industry?

In grades GS-11, -12 and -13, (executive-type employees, with years of experience and college training), with salaries ranging at present from $5940 to $9360 a year, this Air Force base has been losing high quality personnel to private industry. Certainly adequate government salaries are not indicated by these losses.

Did you know that the base salary of a GS-12 has risen only 53 per cent since June, 1941? Did you know that in the period since June, 1941, the base salary of a GS-13 has been raised less than 50 per cent? The base salary of a GS-3 stenographer has been raised 82 per cent since June, 1941, and still the government cannot compete.

It should also be noted that Civil Service employees that entered government service in 1941 are receiving less annual and sick leave now than they received in 1941. Also remember that Civil Service employees pay for their own pensions by deductions from their earned salaries, as contrasted with some pension systems in private industry.

I challenge you to publish facts, not fiction.

J. Milan Green
R.R. 2, Box 303
Dayton, O.

● *Much of your criticism is warranted on the basis of observations at your base. It would be warranted also from certain tight spots like Cleveland, Detroit, some centers on the West Coast, and to a degree Chicago. It would be warranted, further, mainly in connection with certain jobs, such as some key jobs in airplane production and stenographic positions in some of the areas mentioned. The criticism would not be entirely warranted for the country as a whole nor over the wide range of jobs involved. On the basis of such a survey, we believe the main conclusion of the article is true—except for top jobs, there is no great disparity between government and private rates of pay.—ED.*

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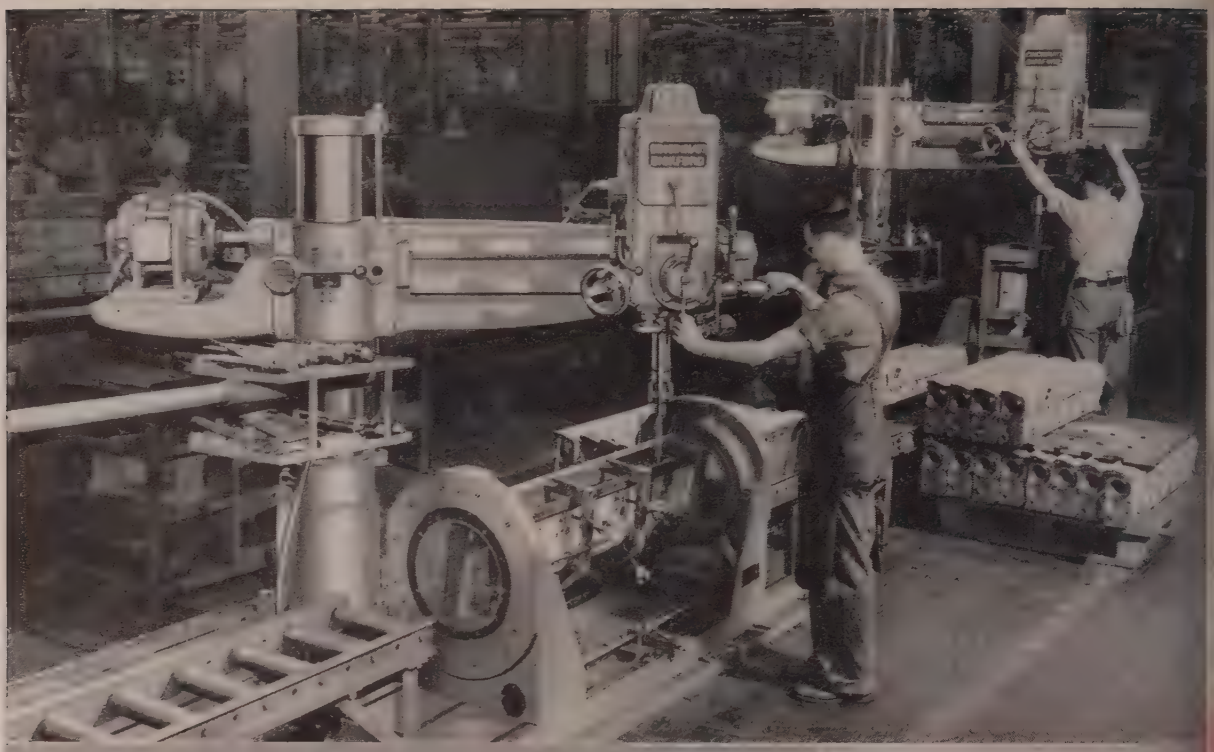
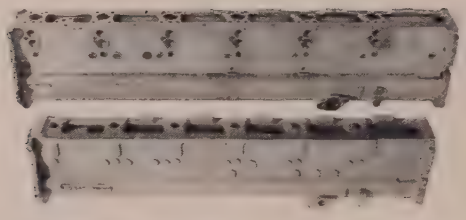


3 years of operation with NO MAJOR MAINTENANCE . . .

Photos courtesy Caterpillar Tractor Co., Peoria, Illinois.



Camshaft Housings for new Caterpillar DW21 Wheel-type Tractor illustrated in insert picture, showing casting before and after drilling operations.

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On this job, including drilling, tapping and reaming, 116 holes are produced, 14 are reamed within .0005″ tolerance. Caterpillar Tractor Co. also states Cincinnati Bickford Super Service Radial Drills have contributed to the advancement of their product.

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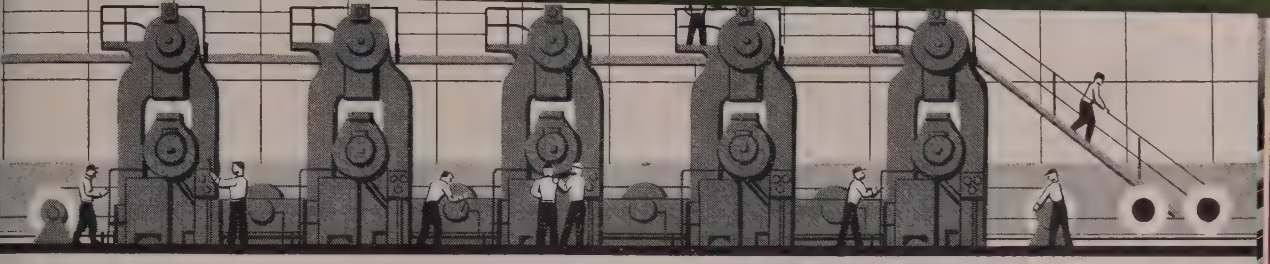

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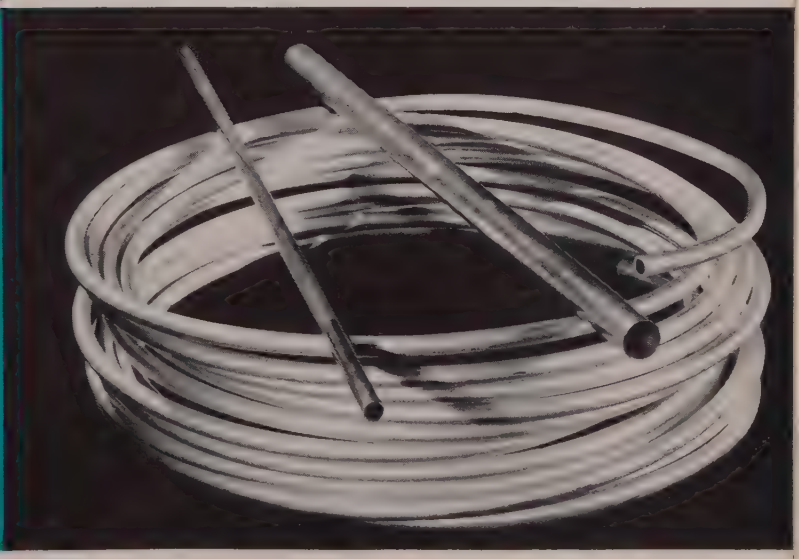

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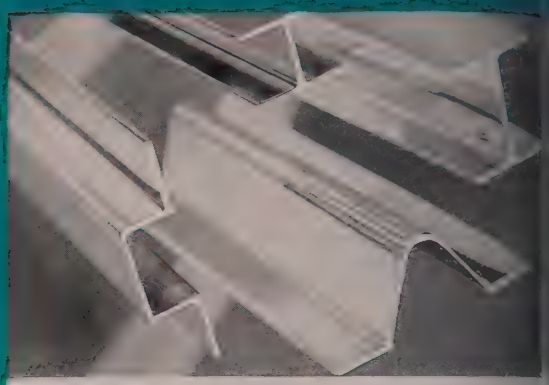

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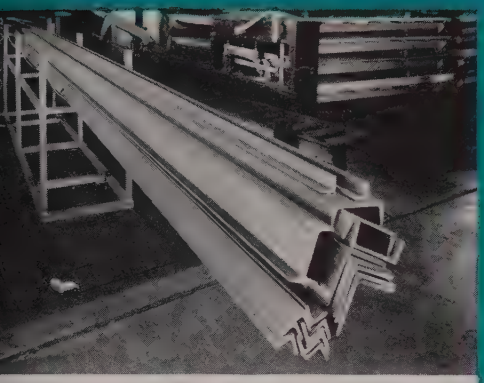
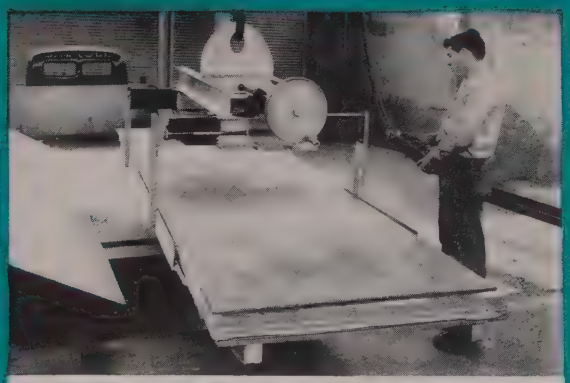
TUBE AND PIPE: Coiled tube; Alcoa Utilitube; straight tube in round, square and rectangular shapes; heat exchanger tubes; standard pipe and pipe fittings; construction pipe; rigid conduit.

WIRE AND ROD: Coiled and straight length; flattened wire; rivet wire and rod for die heading operations in manufacture of rivets, nails, bolts and screws.



LED SHAPES: Equal angles; unequal angles; chan- l-beams; tees; zees. Suited to a variety of structural ications.



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Youngstown is the one manufacturer who makes rigid steel conduit from ore to finished product. This enables Youngstown to control the complete manufacturing process—your insurance that each length of "Buckeye" is made of top-grade steel.

Youngstown

QUALITY · YOUNGSTOWN · SERVICE

●Any electrician recognizes Youngstown rigid steel conduit the moment he starts to bend it. He'll tell you that Buckeye is easier and faster to bend than any other kind. This means you save hours of labor with Youngstown Buckeye Conduit.

THE YOUNGSTOWN SHEET AND TUBE COMPANY *Manufacturers of Carbon, Alloy and Yoloy Steel*

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SHEETS - STRIP - PLATES - STANDARD PIPE - LINE PIPE - OIL COUNTRY TUBULAR GOODS - CONDUIT AND EMT - MECHANICAL TUBING - COLD FINISHED BARS - HOT ROLLED BARS - BAR SHAPES - WIRE - HOT ROLLED RODS - COKE TIN PLATE - ELECTROLYTIC TIN PLATE - RAILROAD TRACK SPIKES

150-ft. spud barge *A. H. Stall*, with its Cooper-Bessemer-powered Bucyrus-Erie 200-W dragline, is owned and operated by J. Ray McDermott & Co., Harvey, La., and has been in highly successful use on various excavating jobs since January 1951. On this operation the unit is swinging a 6-yd. clamshell bucket on a specially extended 140-ft. boom.

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evee will be 6 miles long, 100 feet wide at the and 12 feet high with a 10-ft. crown — an 8- or 9-month excavating job! And on a big, hard-to-reach job like this you soon learn the *extra* value of diesel power you can count on for continuous, trouble-free performance.

Cooper-Bessemer diesels are designed for all kinds of service. They're your best bet when it comes to heavy-duty power.

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Corporation
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SHARP, ACCURATE THREADS SPEED UP ASSEMBLY...

Republic Semi-Finished and Cold Punched Nuts

Sharp, accurate threads run on smoothly, easily ... speed up assembly.

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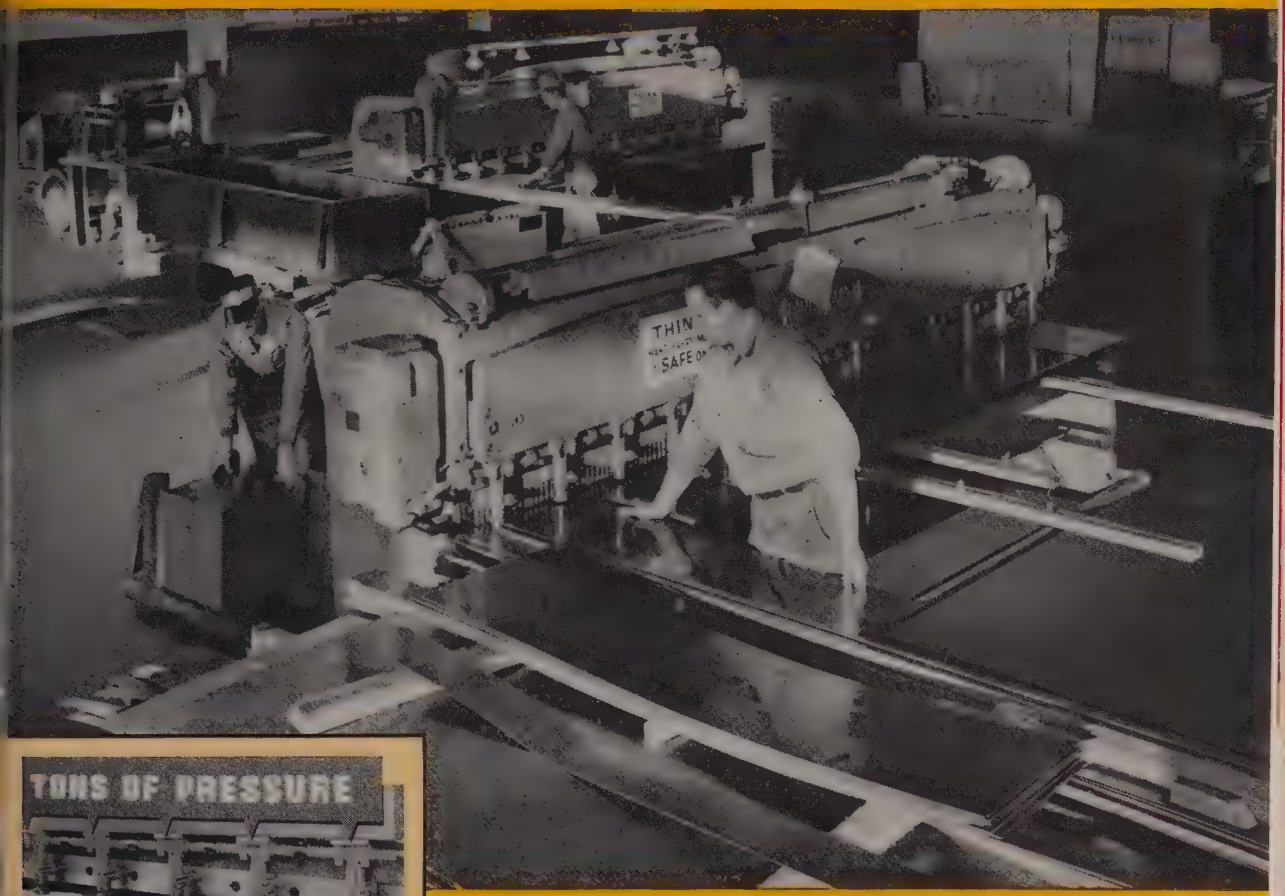
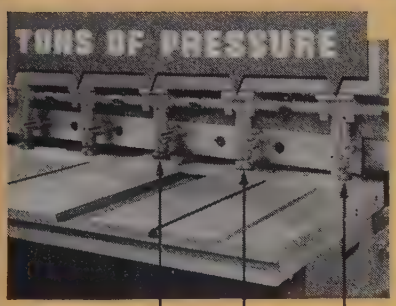
REPUBLIC *Uppon Quality* REPUBLIC STEEL
BOLTS AND NUTS

ACCURACY is necessary





Micrometer accuracy starts with Cincinnati Hydraulic Holddowns. They exert tons of pressure and automatically hold all thicknesses of work securely.

...AND THE SPEED AND VERSATILITY OF CINCINNATI SHEARS IS NEEDED, TOO

Here at The W. J. Holliday Company, Inc., The Department Store of Steel—these busy Cincinnati Shears operating continuously, shear accurate blanks to customer size.

They handle cold finished, or pickled and oiled sheets up to 10 gauge and hot rolled sheets up to ¼". Both management and operators are enthusiastic about their Cincinnati Shears.

Write for Shear Catalog S-6.

Photos courtesy The W. J. Holliday Company, Inc., Indianapolis, Indiana

THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U.S.A. SHAPERS • SHEARS • BRAKES

CINCINNATI

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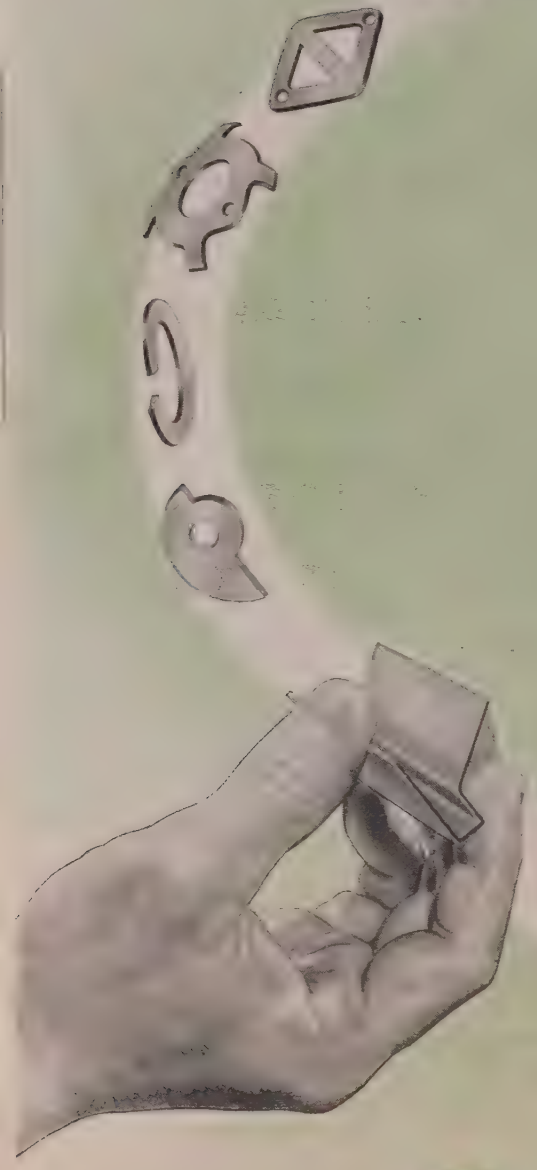
WEIRTON

HIGH-CARBON STRIP
COLD-ROLLED SPRING STEEL

for uniform high-speed blanking and cold forming



Whether your problem is cold forming or blanking, you can depend on Weirton cold-rolled spring steel for best results. It has proved itself in a multitude of applications by consistently meeting the requirements of a variety of products where high fatigue-resistance is a principal factor.

Where superior forming qualities are of prime necessity, Weirton supplies spheroidized-annealed cold-rolled spring steel. The controlled grain structure provides exceptional ductility—assuring you of simple, economical fabrication.

Weirton also supplies cold-rolled spring steel that is temper rolled to produce controlled ranges of hardness and tensile strength. The desired ranges are designed to meet your specific requirements—assuring you of clean, economical blanking.

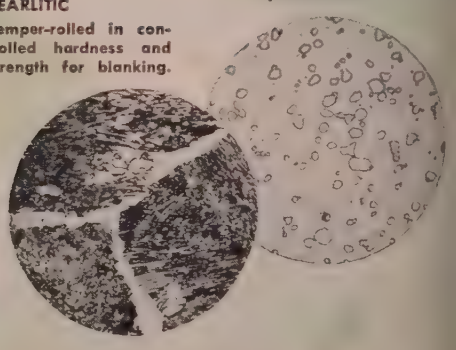
Close manufacturing control has resulted in these highly desirable qualities—unique in Weirton high carbon strip:

Accurate response to heat treatment.
Uniformity of gauge and width.
Uniform chemical and physical properties.
Exact consistency of grain structure.
Controlled decarburization limits.

Weirton high carbon strip is available with the desired chemical analysis and for specific heat treating and hardness ranges, in widths up to seven inches.

SPHEROIDIZED
Annealed, soft and ductile —ideal for cold forming operations.

PEARLITIC
Temper-rolled in controlled hardness and strength for blanking.



WEIRTON STEEL COMPANY

WEIRTON STEEL COMPANY
WEIRTON, WEST VIRGINIA

NATIONAL STEEL CORPORATION

CALENDAR OF MEETINGS

27-29, Alloy Casting Institute: Annual eeting, The Homestead, Hot Springs, Va. stitute address: 32 Third Ave., Mineola, Y. Executive vice president: E. A. hoefer.

28-30, The American Society of Heating Ventilating Enginners: Semi-annual meet-g, New Ocean House, Swampscott, Mass. ociety address: 63 Worth St., New York . President: L. N. Hunter.

30, Steel Shipping Container Institute ec.: Summer meeting, Drake hotel, Chicago. stitute address: 600 Fifth Ave., New York). Secretary: L. B. Miller.

11, National Association of Metal Fin-hers Inc.: Annual meeting, New York. ssociation address: 2117 Le Roy Place, W, Washington 8, D.C. Executive secre-ry: Raymond M. Shock.

12-15, American Electroplaters' Society: nnual convention, Hotel Statler, New York. ociety address: 445 Broad St., Newark 2, . J. Executive secretary: Peter Kovatis.

13-15, Western Plant Maintenance Show Conference: Pan Pacific Auditorium, Los ngeles. Information: Clapp & Poliak Inc., 59 Monadnock Bldg., San Francisco 5.

22-23, Truck-Trailer Manufacturers Association Inc.: Summer meeting, Edgewater each hotel, Chicago. Association address:)24 National Press Bldg., Washington 4. anaging director: John B. Hulse.

ust 2-4, National Tool & Die Manufac-rers Association: Board of trustees and ommittee meeting, Grand hotel, Mackinac sland, Mich. Association address: 907 Pub-c Square Bldg., Cleveland 13. Executive ecretary: George S. Eaton.

ust 8-12, American Society of Sanitary ngineering: Annual meeting, Muehlebach otel, Kansas City, Mo. Society address: 716 Ewing Ave. South, Minneapolis. Secre-ry: Walter A. Dunn.

ust 16-18, Society of Automotive Engi-eers Inc.: National West Coast meeting, otel Statler, Los Angeles. Society ad-ress: 29 W. 39th St., New York 18. Secre-ry: John A. C. Warner.

ust 25-27, Western Electronic Show & Con-ention: Pan Pacific Auditorium and Am-assador hotel, Los Angeles. Business man-ger: Mal Mobley Jr., 344 North La Brea ve., Los Angeles 36.

ust 30-September 3, Automotive Electric ssociation: Annual fall meeting, Vanss prings hotel, Vanss Springs, Alberta, anada. Association address: 802 Michigan ldg., Detroit. Executive secretary: S. W. otter.

tember 1-16, International Electrotechnical ommission: Golden jubliee meeting, Uni-ersity of Pennsylvania, Philadelphia. In-ormation: D. E. Denton, Public Relations ept., American Standards Association, 70 . 45th St., New York 17.

tember 4-8, Pressed Metal Institute: An-ual fall meeting, Manoir Richelieu hotel, Murray Bay, P.Q., Canada. Institute ad-ress: 2860 E. 130th St., Cleveland. Manag-ng director: O. B. Werntz.

tember 7-9, Industrial Truck Association: all meeting, Greenbrier hotel, White Sul-hur Springs, W. Va. Association address: Washington Loan & Trust Bldg., Washing-on. 4. Secretary: William Van C. Brandt.

tember 7-9, National Fluid Power Associa-ion: Fall meeting, Hotel Commodore, New ork. Association address: 1618 Orrington ve., Evanston, Ill. Secretary: Barrett ogers.

tember 8-10, American Society of Mechan-al Engineers: Fall meeting, Schroeder otel, Milwaukee, Wis. Society address: 29 . 39th St., New York. Secretary: C. E. avies.

tember 11-14, Packaging Machinery Manu-acturers Institute: Annual meeting, Grove ark Inn, Asheville, N. C. Institute ad-ress: 342 Madison Ave., New York 17. ecretary: Miss Helen L. Stratton.

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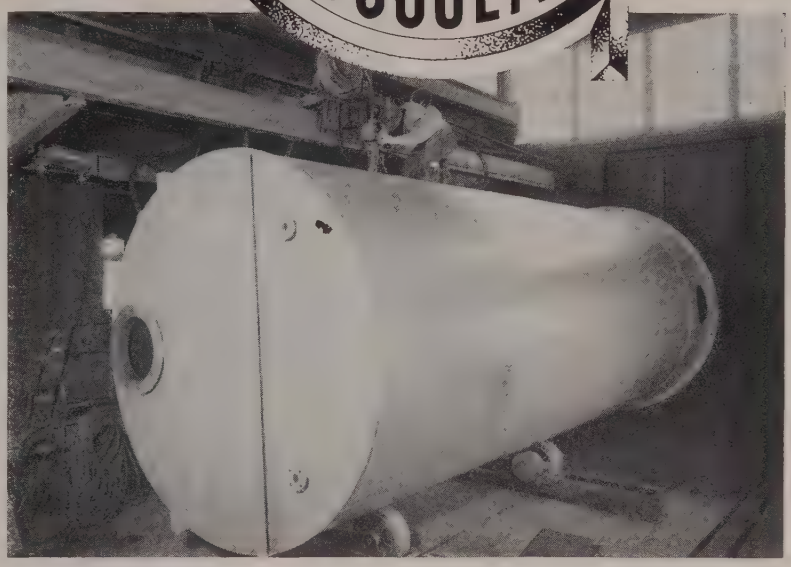
ANY SIZE OR TYPE, IT WILL PAY YOU TO CHECK FIRST WITH

GUSSETT



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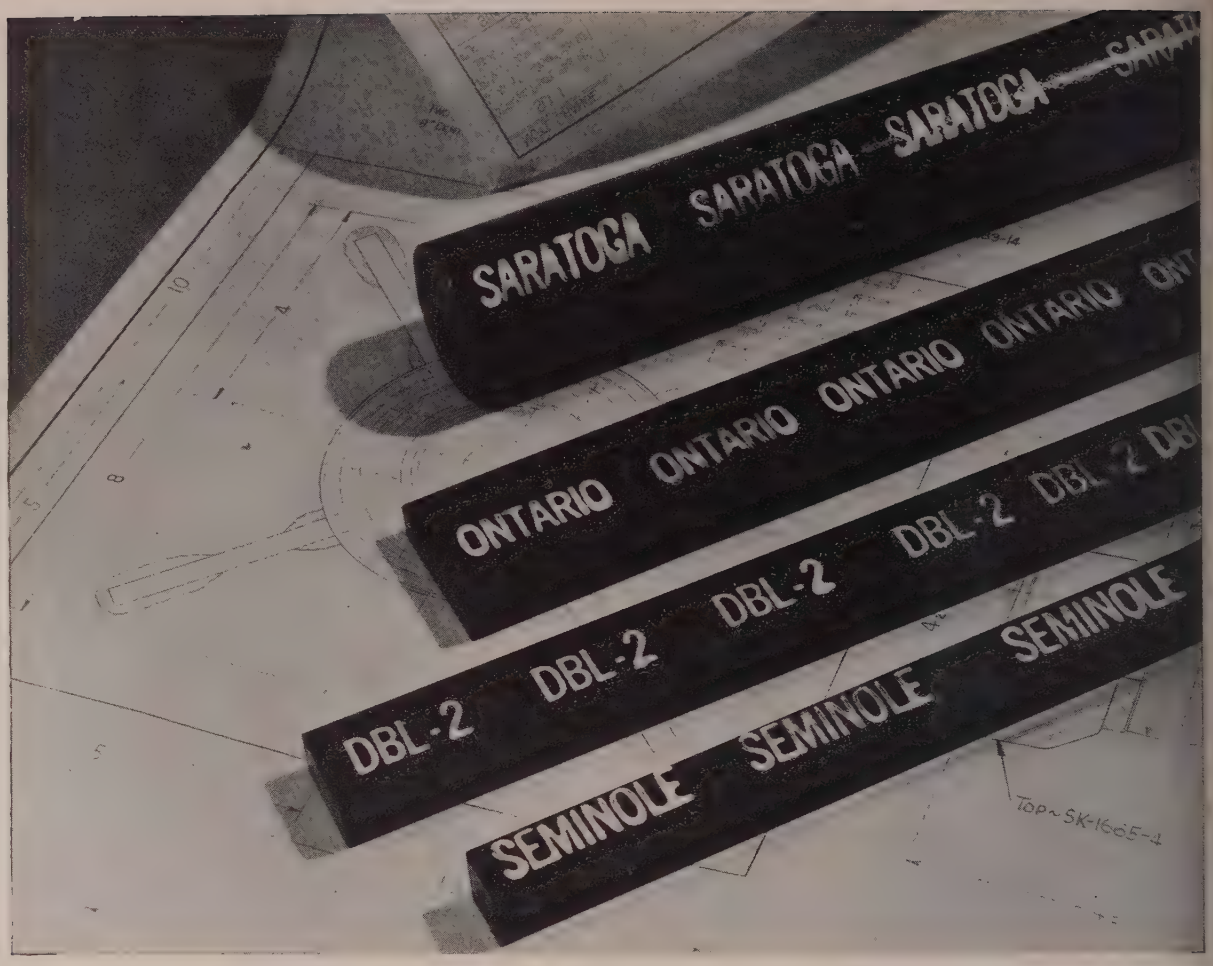

LUDLUM TOOL STEELS are *clearly* marked . . . you can't mix up grades in your stock

For Production Men Only

"TOOL STEEL HANDBOOK"

We say "production men only" because this is a *work* book, not a picture book. It's a case-bound volume of 196 pages, packed full of technical data on the analyses, uses, handling and shop treatment of all grades of A-L Tool and Die Steels. Sent free, but ask for it on your company letterhead, please.

Address Dept. S-542

"What's *that* piece?" . . . "Are you *sure?*" . . . In anybody's toolroom or stock racks, the best inventory or material identification system is apt to go haywire once in a while—and sometimes with grievous results.

But not when you're using tool steel grades produced by A-L! Each length of Ludlum Tool Steel is clearly marked with its grade name every few inches the entire length of the bar—*stencilled* in such a manner that the marking stays bright and clear, and can't be blurred or wiped off in handling.

Even a small crop end on a machine bench is readily identifiable—you can't go wrong. And that's only a small part of the benefit you can realize by using Ludlum Tool Steels—available from stocks coast to coast. Let our Metallurgical Service go to bat on some of your tougher tool steel problems. ***Allegheny Ludlum Steel Corporation, Oliver Bldg., Pittsburgh 22, Pa.***

For complete **MODERN** Tooling, call

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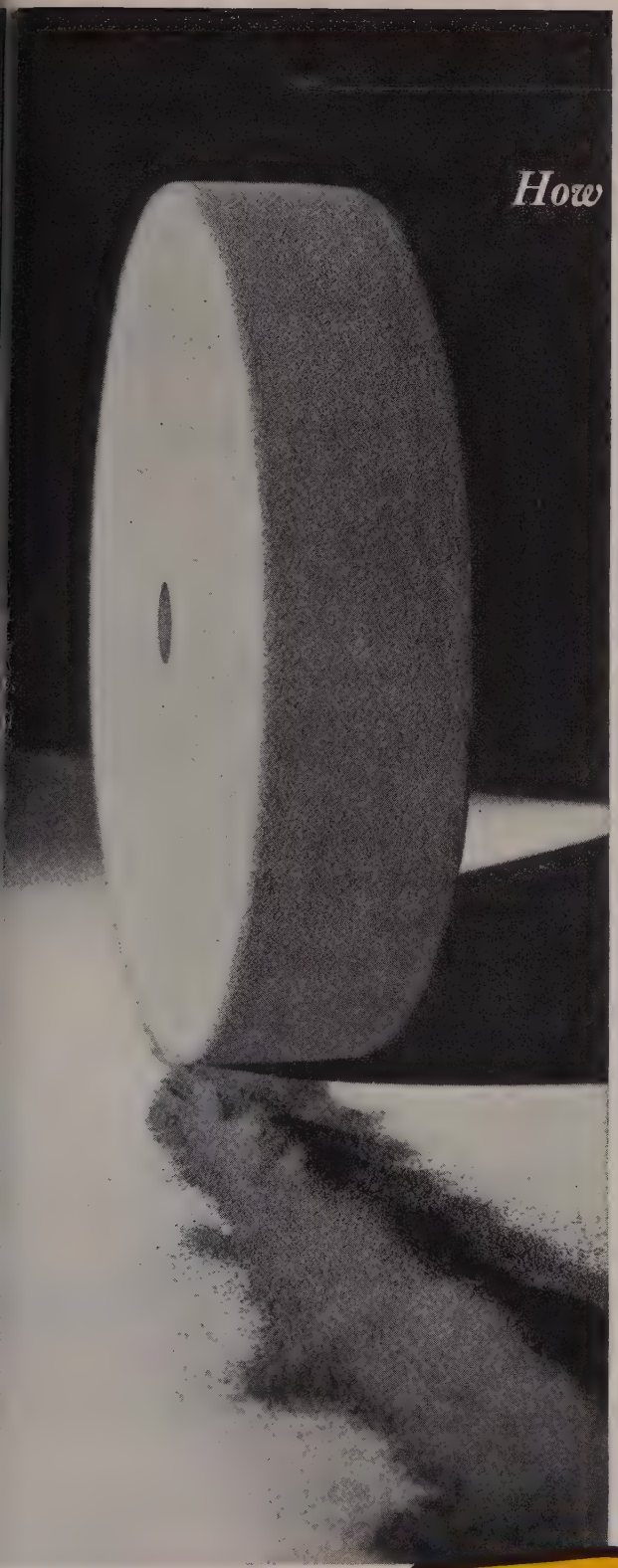
WAD 5221

AL® FINE TOOL STEELS SINCE 1854



How ALUNDUM grain adds the profit-boosting "TOUCH of GOLD" to all your polishing wheel operations*

When setting up your metal polishing wheels or belts, remember these advantages of Norton ALUNDUM abrasive grain:

- It is extremely hard, tough and sharp.
- It is uniform in chemical composition, crystal structure and grain size — no oversize grains to mar the surface, no undersize grains to loaf on the job.
- Its high capillarity, produced by special Norton processing, means easier wetting with the glue and assures stronger, faster cutting, longer lasting wheel heads.
- *And you can get* ALUNDUM *grain in exactly the grain shapes and surface treatments you need to add the product-improving, money-saving "Touch of Gold" to every step of polishing, with every type of wheel and on every metal.*

Watch your setting up temperatures!

Cold wheels and cold abrasive grain jell the hot glue too rapidly, which reduces its adhesiveness and prevents sufficient pickup of grain, resulting in slow cutting, hot running wheel heads. To guard against this, pre-heat wheels and grain to between 100° and 120°F, so the glue solution can be applied at a temperature of 140°F. Also, hold the setting up room temperature around 80°F, use uniform pressure when rolling wheels in the grain trough, and make the whole procedure as fast as possible.

Further helpful information

on every factor in the setting up process — including the selection of ALUNDUM grain, preparation of glue, use of cement, drying operations, wheel types, polishing different metals, etc. — is contained in the Norton booklet *Setting Up Metal Polishing Wheels and Belts.* Your Norton Distributor can supply it, and can make quick deliveries of ALUNDUM grain from complete stocks in key cities. Or write to NORTON COMPANY, Worcester 6, Mass. Distributors in all principal cities, listed under "Grinding Wheels" in your classified phone directory. *Export:* Norton Behr-Manning Overseas Incorporated, Worcester 6, Massachusetts. G-275

Making better products... to make other products better

NORTON

and its BEHR-MANNING division

NORTON: Abrasives • Grinding Wheels • Grinding Machines • Refractories
BEHR-MANNING: Coated Abrasives • Sharpening Stones • Pressure Sensitive Tapes

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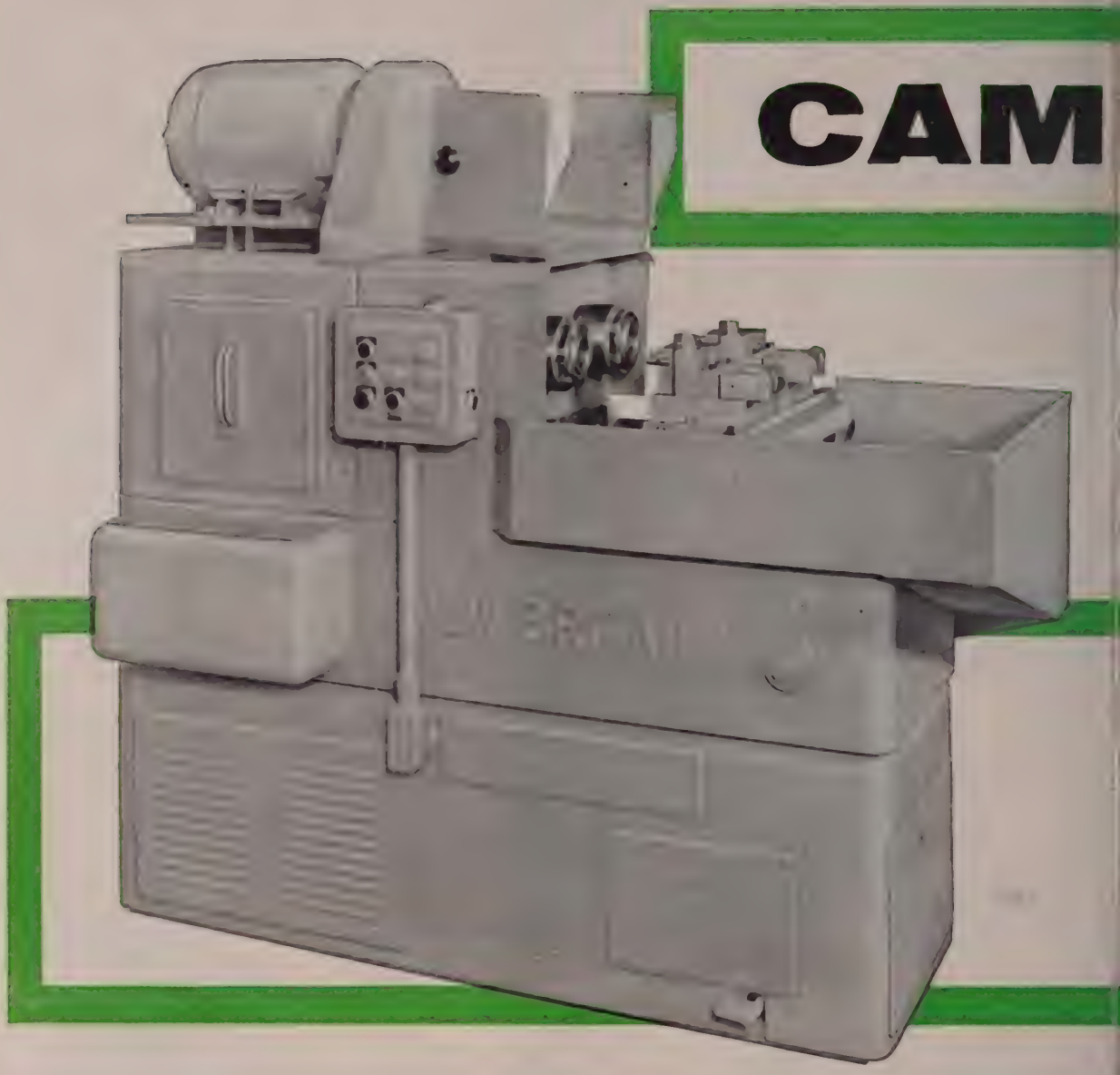
New Britain's Precision

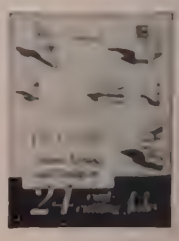
CAM



New Britain's exclusive application of cam control (illustrated diagrammatically on the opposite page) gives your tool engineer a completely new approach to tooling for complex pieces. Methods impossible on other types of machines can be employed to speed production and eliminate second operations.

A New Britain precision boring machine will not only turn out a wide variety of work at high speeds, but, because of cam actuation, will continue producing them with the same repetitive accuracy — piece after piece, week after week.

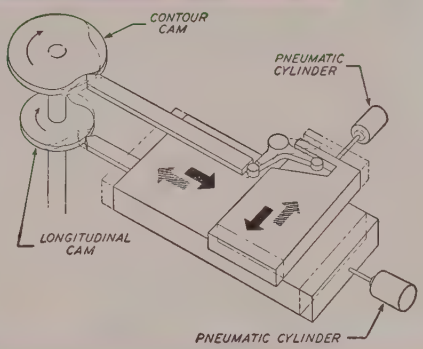
Write for descriptive literature on the New Britain boring machine line, including the details of a variety of specific parts turned out on New Britains.



Boring Machine is . . .

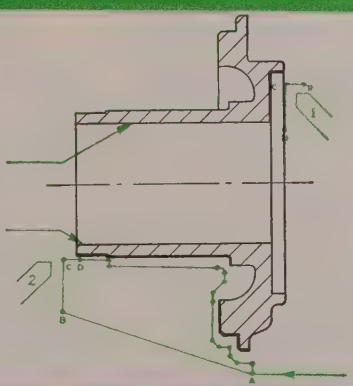
ACTUATED

This schematic diagram illustrates the positive cam control of both straight and contour slides, and the compound slide motion which permits an endless variety of single point tool paths.



Expanding arbor chucks piece on I. D.

Back face positively locates against chuck.



With conventional methods, pieces like this present a problem of costly tooling. With New Britain's new approach, tooling this piece is fast, simple and economical with a single chucking and two single point tools.

When you invest in Boring Machines PICK THE MAKE WITH THE EARNED REPUTATION.

THE NEW BRITAIN MACHINE COMPANY

New Britain-Gridley Machine Division, New Britain, Connecticut

Our general catalog is filed in the Sweet's Machine Tool Catalog File.

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"Avondale's Salute to Steel"

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***HARVEY YARD** • Harvey, La. Quick repairs, dry-docking, and propeller service.*

***SERVICE FOUNDRY** • New Orleans, La. Iron, steel and non-ferrous castings, cut gears, and large capacity machine work.*

***AVONCRAFT DIVISION** • Architectural porcelain enamel on steel load-bearing walls, load-span decking and curtain walls.*

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Our QUALITY will satisfy you . . . Our SHIPMENTS prompt, from ample stock . . . Our INTEREST in Customer requirements means "Once a Washburn Customer Always a Washburn Customer"

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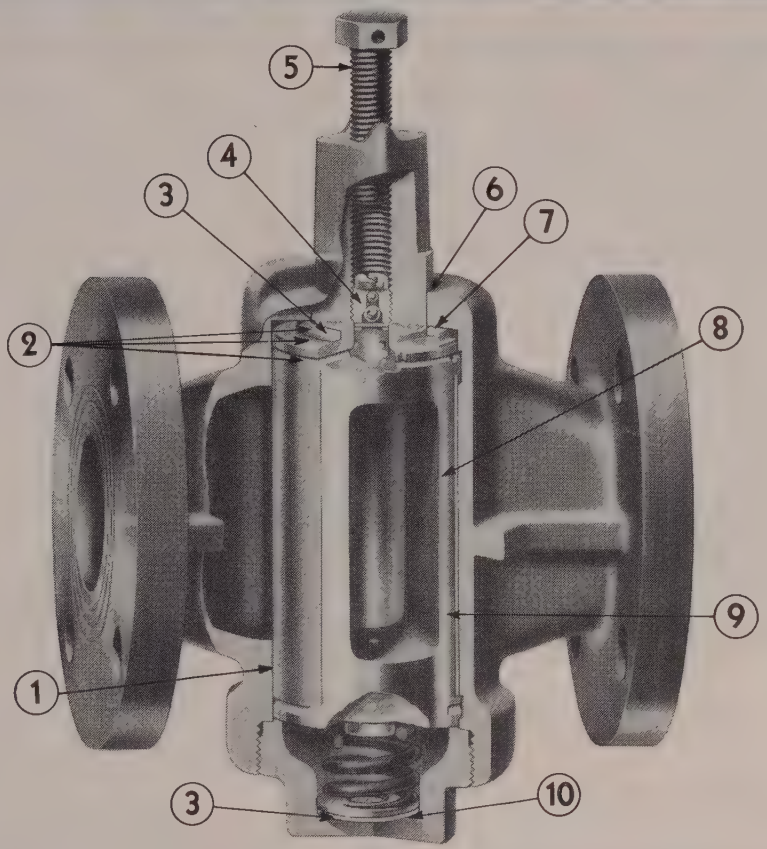
CLEAN, UNIFORM BILLETS - STRIP - RECTANGULAR, ROUND, FLAT RODS

TEMPERED AND UNTEMPERED FLAT AND ROUND HIGH CARBON WIRES

NEW HOMESTEAD
lubricated plug valve

(Patents Pending)



with features that guarantee longer, low-cost service

. . . and really low priced!

1. Close tolerance between sealing surfaces—extra long valve life—less lubricant needed.
2. Triple head seal—two rings of lubricant, and a teflon sealing ring prevent leakage.
3. Plug floated on teflon rings—low friction—extra ease of turning.
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6. Extruded lubricant shows when system is full. Minimum contamination of line fluids.
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8. 100% pipe area or venturi patterns.
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10. Spring torsional stress relieved by teflon washer—less maintenance—longer life.
11. No mechanical adjustments—human error minimized.
12. Two lubricants handle most all services.

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HOMESTEAD VALVE MANUFACTURING CO.

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Trade Mark

RODINE

Reg. U.S. Pat. Off.

PICKLING ACID INHIBITOR

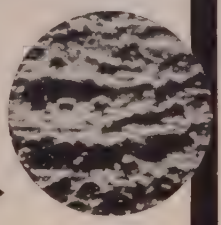
"Rodine" more than pays for itself in savings of acid and metal. More uniform pickling and better pickled surfaces are obtained when "Rodine" is used in acid pickling baths.

Pickling in Uninhibited Sulfuric Acid
Pickling in "Rodine"-Inhibited Sulfuric Acid
Nail Pickled in Uninhibited Sulfuric Acid
Nail Pickled in "Rodine"-Inhibited Sulfuric Acid

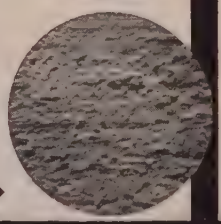
The photographs above illustrate the beneficial effect produced by a small amount of "Rodine" in a pickle bath.

A. Both test tubes contain a 10 per cent by volume solution of sulfuric acid. In the left-hand tube, no further additions have been made to the acid. Notice the gas bubbling off the nail. This is hydrogen, caused by the action of acid on good metal. In the right-hand tube, "Rodine" has been added in an amount equal to 1 per cent by volume of the concentrated acid. Notice the absence of bubbling in this tube. "Rodine" prevents the formation of hydrogen that results from dissolving metal.

B. Both nails after being pickled for the same time. The nail pickled with "Rodine" has lost little weight and has retained its original luster and appearance. The nail pickled without "Rodine" is no longer a nail. "Rodine" prevents the acid from dissolving metal.



This steel surface was pickled in an uninhibited acid bath. Note the deep pits, and that the surface is visibly crystalline.



This surface was pickled exactly like the one above except that "RODINE" was added to the acid solution. Only scale pockets and roll marks are visible; no pitting occurred.

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AMERICAN CHEMICAL PAINT COMPANY

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Which package is best for you?

ROEBLING HIGH CARBON WIRE is packaged in many ways... and for every kind of usage there's one particular type of packaging that will bring top handling and production efficiency... new economy in your plant. For certain wires, Roebling's new large-size reels or new disposable spoolless cores have special money-saving advantages:

The large reels are ideal for long runs. They reduce down time to a minimum.

The new spoolless core (a hollow fibre core without flanges) abolishes the storing and return of empty spools ... eliminates charges for spools and waiting for credits.

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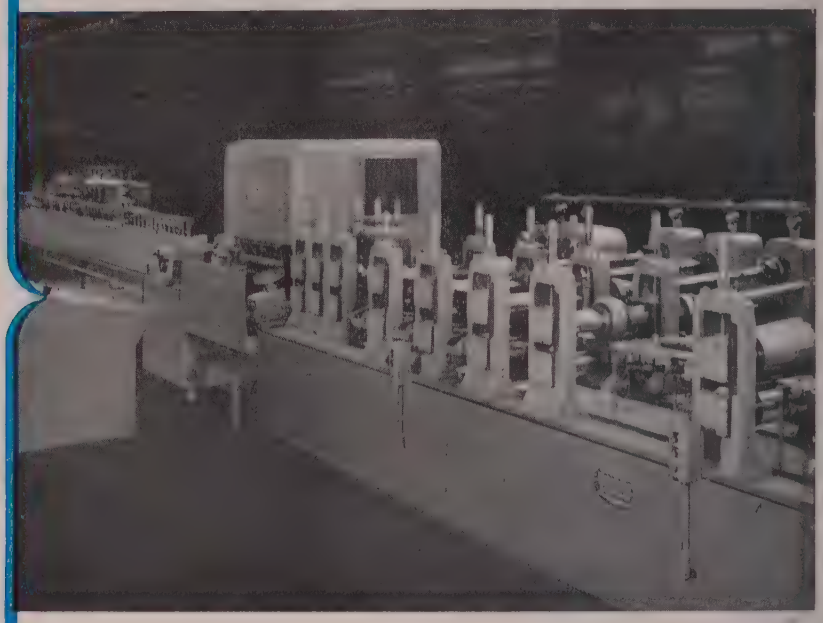
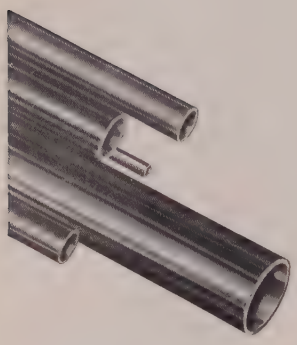
NEW YODER-TOCCO *induction-weld* TUBE MILLS





almost TWICE AS FAST

as any electric-weld Pipe and Tube Mill built anywhere!

These new Yoder mills, incorporating the patented Yoder-Tocco induction welder, among other advantages afford welding speeds from 150 to 250 fpm. on pipe and tube sizes from ⅜ in. up to 3½ in. dia. This means almost 100% increased production of fine tubing compared with any resistance or induction welder known or actually built, in the U.S.A. or any other country.

For further information about these and other Yoder tube mills, write, phone or wire

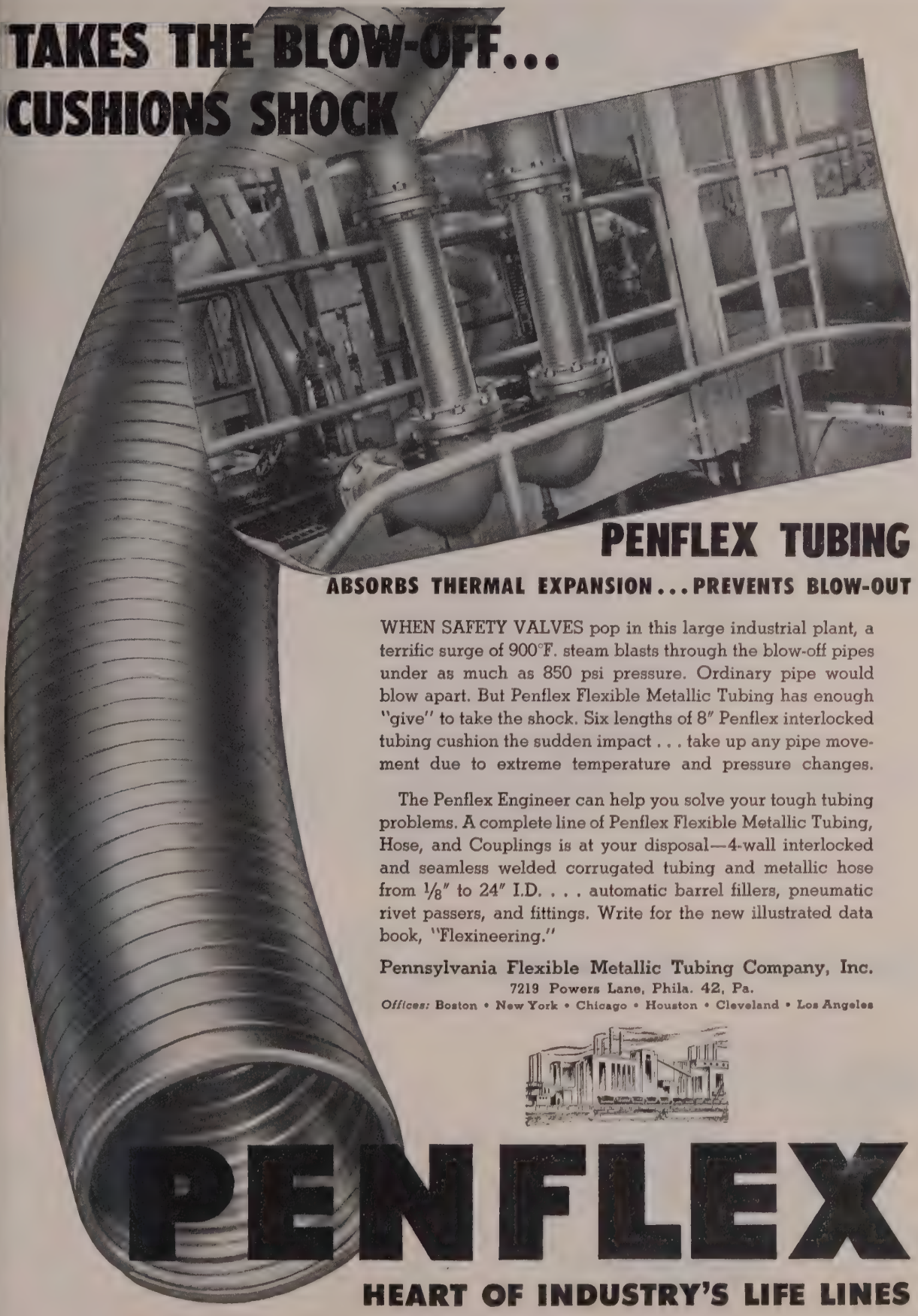
THE YODER COMPANY
5502 Walworth Avenue • Cleveland 2, Ohio

Complete Production Lines

- ★ COLD-ROLL-FORMING and auxiliary machinery
- ★ GANG SLITTING LINES for Coils and Sheets
- ★ PIPE and TUBE MILLS–cold forming and welding

ENGINEERING YODER MANUFACTURING

TAKES THE BLOW-OFF... CUSHIONS SHOCK



PENFLEX TUBING

ABSORBS THERMAL EXPANSION... PREVENTS BLOW-OUT

WHEN SAFETY VALVES pop in this large industrial plant, a terrific surge of 900°F. steam blasts through the blow-off pipes under as much as 850 psi pressure. Ordinary pipe would blow apart. But Penflex Flexible Metallic Tubing has enough "give" to take the shock. Six lengths of 8″ Penflex interlocked tubing cushion the sudden impact . . . take up any pipe movement due to extreme temperature and pressure changes.

The Penflex Engineer can help you solve your tough tubing problems. A complete line of Penflex Flexible Metallic Tubing, Hose, and Couplings is at your disposal—4-wall interlocked and seamless welded corrugated tubing and metallic hose from 1/8″ to 24″ I.D. . . . automatic barrel fillers, pneumatic rivet passers, and fittings. Write for the new illustrated data book, "Flexineering."

Pennsylvania Flexible Metallic Tubing Company, Inc.
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HEART OF INDUSTRY'S LIFE LINES

To help your salesmen open more doors...

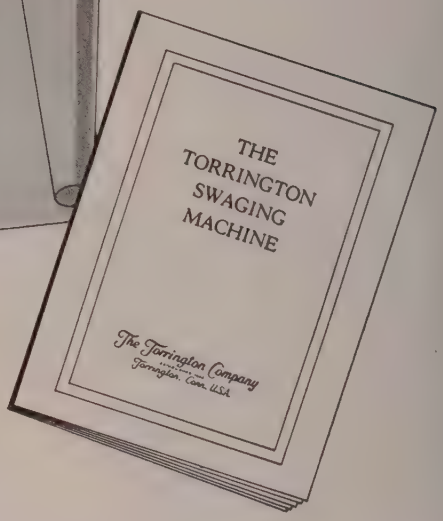
Put the strength of STEEL

138,000 Management, Production, Engineering and

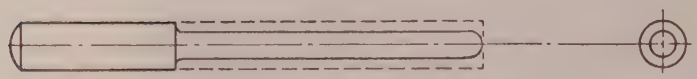
Purchasing executives read it . . . use it . . . depend upon it!

into your advertising program

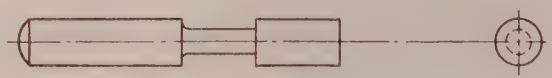
Swaging Success Stories



Close Tolerances... without Machining

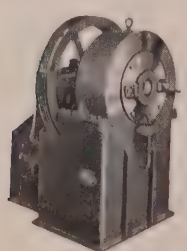


This finished piece used to be made on an automatic screw machine with the long, narrow diameter section turned to .100 ±.003 and a necessary sharp shoulder.



Torrington's swaging experts suggested starting with this simple screw machine blank (to retain the required shoulder).

Result after one rotary swage—an improved finished piece, to a tolerance of ±.001.



THE TORRINGTON COMPANY
Swager Department
150 North Street, Torrington, Conn.
Makers of Torrington Needle Bearings

Why not write for our informative booklet on swaging that includes complete descriptions of Torrington Rotary Swagers. It may show you how you can achieve a "swaging success story" in your own plant.

See what savings you can make by swaging

1. Saving in material—swaging uses nearly all the metal.

2. Saving in time—swaging is fast.

3. Saving in labor—unskilled labor can run a swager.

4. Saving in machining—swaging produces finishes accurate to ±.001.

5. Saving in finishing operations—swaging produces high finish, better hardness and resiliency.

TORRINGTON ROTARY SWAGING MACHINES

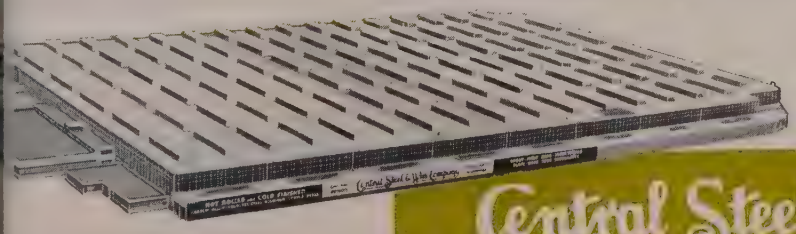
BARS

HOT ROLLED • COLD FINISHED

carbon and alloy, stainless steel

brass and copper, aluminum

many analyses in a wide range of sizes, cut to your multiple lengths



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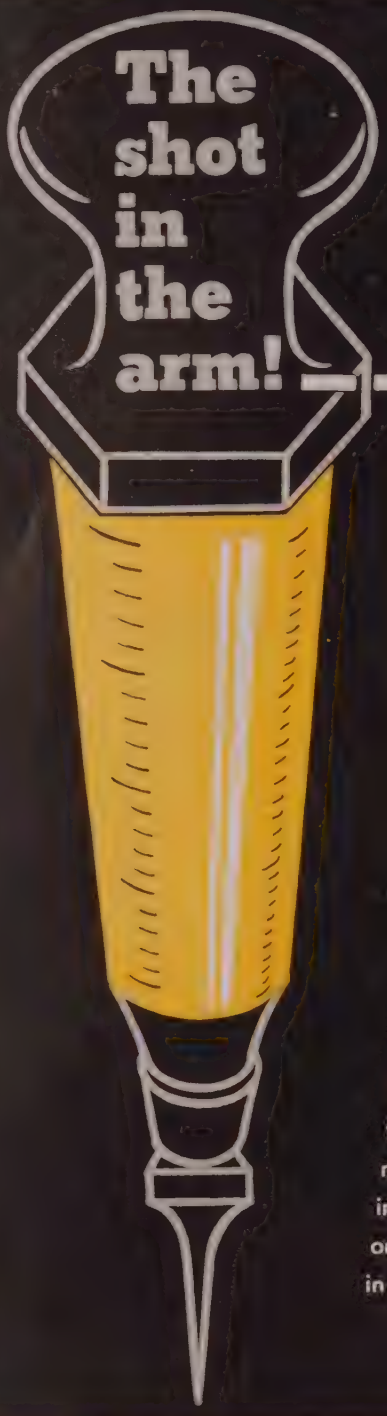

The shot in the arm! — Engineering!

Building any kind of a heat enclosure? Then be sure to call in a specialist. He's the one who has the engineering "know how"—the one who provides the shot in the arm.

And that shot in the arm—engineering—is the vital factor which assures the life of the installation.

Bigelow-Liptak has a team of that kind of engineer. Every job—big or little—is engineered to the "nth" degree. Sound engineering—coupled with top materials and B-L's unique, unit-suspended construction—gives you a job you can be sure of . . . one that has the stand-up stamina for tough, every-day going . . . one that costs less in the long run.

Applications? Whenever heat must be controlled: for boiler settings, oil stills, cat crackers, metallurgical furnaces, driers, kilns, incinerators. You can get more information on how to give your "coming up" installation a shot in the arm if you write—today!

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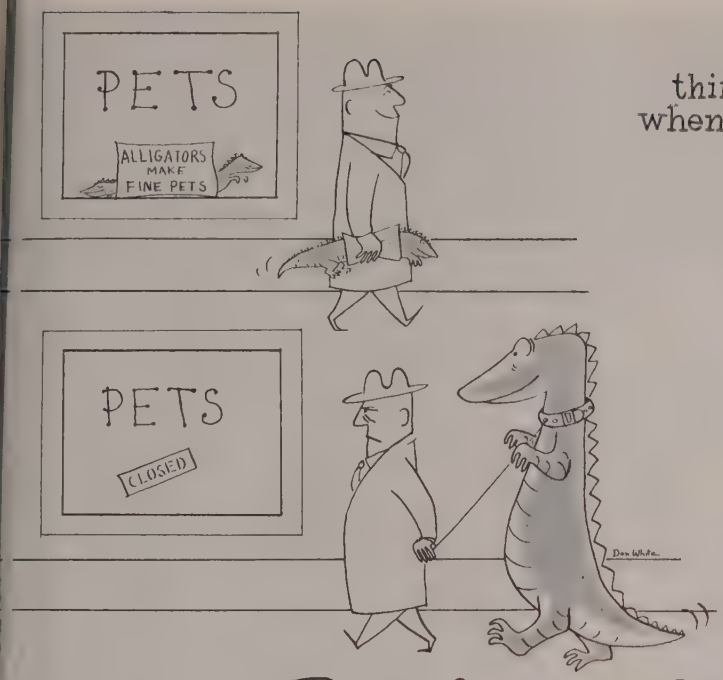

things to watch for
when buying alligators . . .

But if you're buying special purpose STEELS, may we recommend the SPEED STEELS

SPEED CASE — a low carbon free machining open hearth steel

SPEED TREAT — a medium carbon free machining open hearth steel

SPEED ALLOY — a chromium alloy steel

briefly they

- ✓ are easy to heat-treat
- ✓ are fast machining
- ✓ give longer tool life
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Speed steels are produced by W. J. Holliday & Co., Inc., Speed Steel Plate Division

Photographed through courtesy of Macy's New York

CAUGHT!—by Silent Sounds

Suddenly, the lights snap on. Someone yells—

"Don't move or we shoot!"

How had the burglar been detected? No one saw him enter. There was no watchman. And no sign of an alarm system.

No obvious sign, that is. But there *was* a system — the Alertronic Burglar Alarm.

This unusual protective device operates by sending out 19,200 cycle-a-second sound waves, too high for human ears to hear. The slightest movement of an intruder disturbs these waves of silent sound and activates the alarm. It's so sensitive that even the motion of heated air rising from a fire sets it off.

What produces the vibrations? Two slender nickel rods—and a principle of physics called *magnetostriction* (the peculiar way they change size in a changing magnetic field).

Putting magnetostriction to work in this ultrasonic burglar alarm — the first ever to be approved by The Underwriters' Laboratories—wasn't an overnight job. It was twelve years ago that the inventor made his first experiments.

The search for a material with necessary magnetostrictive properties ended when he came to Inco — for nickel proved to be the material he was seeking.

And, as it turned out, he got more than a metal from Inco . . .

In the years that have passed, he has found Inco always ready to help in supplying information on the physical and mechanical properties of Inco Nickel Alloys and other metals . . . on the technical aspects of magnetostriction . . . and on questions involving metal fabrication.

This same type of friendly cooperation, of course, is available to you for the asking. Let's get together on *your* problem.

The International Nickel Company, Inc.
67 Wall Street New York 5, N. Y.

Inco Nickel Alloys

INCO TRADE MARK

MONEL® • "R"® MONEL • "K"® MONEL
"KR"® MONEL • "S"® MONEL • INCONEL®
INCONEL "X"® • INCONEL "W"®
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LOW CARBON NICKEL • DURANICKEL®

STEEL
June 28, 1954

Metalworking Outlook

Taxes and Confidence

Last April *The Economist*, a British weekly that keeps track of U.S. conditions, expressed surprise that "the American recession is not behaving as expected." It pointed out that unemployment and "the primary loss of income should have given rise to secondary difficulties." Now that more economic figures are in and an upturn has come (pp. 55-58), it's possible to appraise what has happened and what's still going on. The tax reductions by the administration and Congress are the main reason for the stability, believes the National Industrial Conference Board. Just as important, STEEL believes, is the intangible, business confidence. Proof of that confidence is capital outlays. Despite unemployment and declining sales of the past six to nine months, planning for new plant and equipment in 1954 went on, and spending will hit $27.1 billion this year, only 5 per cent from the record $28.4 billion in 1953.

Accomplishments in Washington

Congress in 1954 will have pared taxes $7.4 billion, the largest dollar tax cuts ever made in a single year. About two-thirds of the reductions go to individuals; the rest aids business. The administration has cut spending by $7 billion from the Truman budget this year and will slash another $5 billion next.

Employment in the Future

What effect will America's advancing technology have on employment in the future? Council for Technological Advancement predicts: More manufacturing jobs—since 1939 employment in manufacturing has jumped 70 per cent, population 22 per cent; more trade and service jobs—fastest growth will come in industries and occupations providing luxury goods and services; fewer farming and mining jobs; less manual labor; more demand for specialized skills; more jobs for women—33 per cent of all jobs may be filled by women by 1975, compared to 30 per cent now.

Pay Is the Pay-off

United Steelworker President David J. McDonald last week called some unnamed executives of U.S. Steel Corp. "vultures." The "vultures" in all business and industry last year paid their wage earners and salaried employees a record $207.6 billion, 67.8 per cent of the national income, up from 66.3 per cent in 1952, 65.8 per cent in 1939 and 58.2 per cent in 1929.

What a Yardstick Shows

In the Cleveland area, often taken as a yardstick for industrial America because of the diversity of industry there, the average employee now earns $1.963 an hour, excluding overtime and shift premiums. Associated Industries of Cleveland, in its annual survey of personnel practices, finds that

The Technical Outlook—p. 99 The Market Outlook—p. 149

fringes cost the average employer 30.82 cents per man-hour for six paid holidays a year, five to 15 days' vacation, a $2000 to $2500 group life insurance policy, sickness and accident benefits and shift premiums ranging from 5 to 10 cents an hour for the second shift and from 7 to 12 cents an hour for the third shift.

CIO Spurs Drive on GE Plants

The CIO's electrical workers plan an all-out drive to move in where they don't now have contracts at General Electric Co. plants. That means a heightened campaign against the rival United Electrical workers. The CIO-IUE has filed representation election petitions for ten plants with 49,000 workers across the nation. The big push is on GE's main plant in Schenectady, N. Y., with its 20,000 employees.

Prices: Stability Ahead

Look for stable prices to continue through the summer. The government's cost-of-living index hit 115 of the 1947-1949 base in mid-May, a 0.3 per cent increase and the first even slight gain in three months. The hike occurred largely because of rising food prices.

In Case of Attack

The Steel Products Industry Advisory Committee of Business & Defense Services Administration has just completed a comprehensive manual on what to do in case of H-bomb attack. BDSA calls the job "the best of its kind" and is trying to get it printed for wide distribution because the counsel offered would be applicable to many firms besides steel companies. BDSA hasn't the money to print the book and seeks a private sponsor.

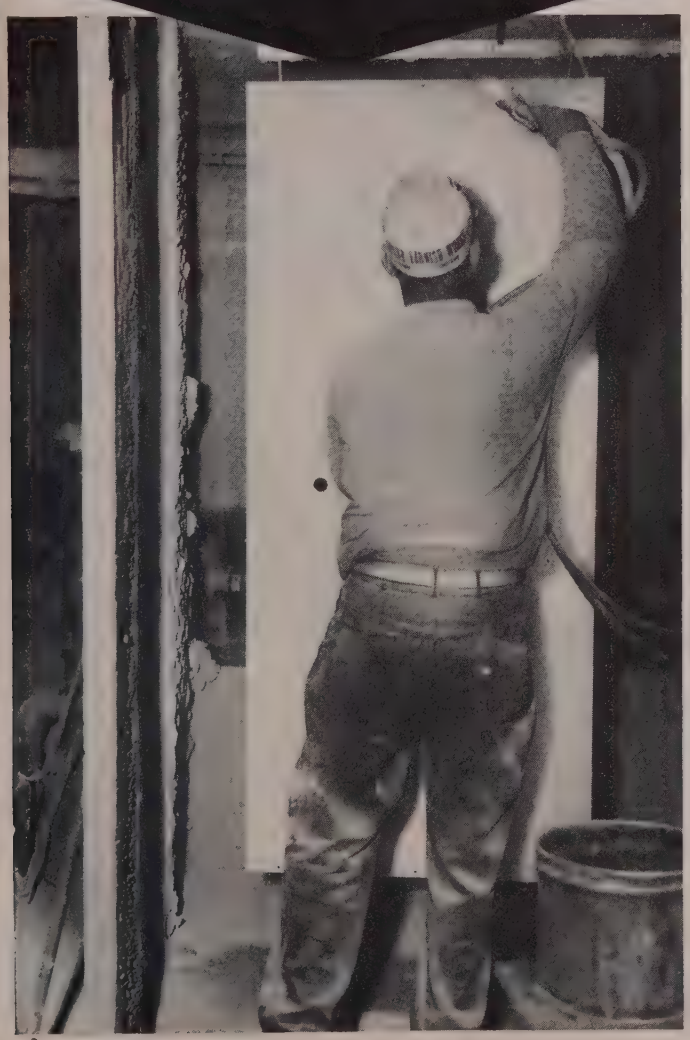
Straws in the Wind

General Electric Co. predicts a two-fold increase in distributor sales of fluorescent installations and accessories within the next five years . . . Tracerlab Inc. has cut prices up to 60 per cent on cesium-137 radiographic sources; a 1-curie source formerly $1175 is now $275, for example . . . Chicago's air pollution problem is everyone's fault and not solely industry's, says Armour Research Foundation . . . Boeing Airplane Co. is introducing a new gas turbine engine to power aircraft, boats, pumps, compressors and generators . . . New orders for industrial supplies for May were 97.83 per cent of April, 1954, orders and 129.38 per cent of July, 1948, reports American Supply & Machinery Manufacturers' Association.

This Week in Metalworking

Odds are still against a steel strike despite the snag that turned up in negotiations last week (p. 59) . . . Manufacturers of centralized lubrication systems find that their years of missionary and educational work are paying off in improved sales for 1954 (p. 60) . . . Packard's James Nance will be president and chief executive officer of the new Studebaker-Packard Corp. (p. 61) . . . The electronics industry foresees a record $5-billion-plus year in 1954 (p. 66).

Saves 2½¢ a square foot on paint costs, boosts production 40% with this Special Steel



Here's how one manufacturer boosted production and saved money—including 2½ cents a square foot on paint cost. He changed over from regular cold-rolled steel to Armco Cold-Rolled PAINTGRIP, a cold-rolled sheet with a mill-applied phosphate coating over an electrolytic flash of zinc.

Saves on Cleaning Costs

Armco Cold-Rolled PAINTGRIP is shipped dry; cold-rolled steel was shipped oiled. Therefore, Cold-Rolled PAINTGRIP is much easier to clean in preparation for painting.

Eliminates Primer

Armco Cold-Rolled PAINTGRIP eliminated the necessity of a primer coat, formerly required for both sides of the panel. Figuring paint coverage at 200 square feet a gallon, the primer cost 2 cents a square foot per side or 4 cents a square foot for both sides. The additional cost of Armco Cold-Rolled PAINTGRIP is about 1½ cents a square foot for 20-gage material. Yet by eliminating the primer cost of 4 cents per square foot, *there is a net saving of 2½ cents a square foot.*

Increased Production, Too

The manufacturer has limited painting capacity. By eliminating the primer coat, he estimated 40 to 50 per cent greater production with no increase in facilities. This made possible a large operational saving.

Holds and Preserves Paint

Tests show that paint lasts several times longer on Armco Cold-Rolled PAINTGRIP than on regular cold-rolled steel. There is no premature flaking or peeling because the paint-holding surface also *helps preserve paint.* Armco Cold-Rolled PAINTGRIP is recommended for flat or drawn parts where long paint life is essential and where an extra-smooth finish is desirable.

For complete information write for the booklet, "Armco Cold-Rolled PAINTGRIP."

ARMCO®

Armco Steel Corporation

4174 Curtis Street, Middletown, Ohio

Export: The Armco International Corporation

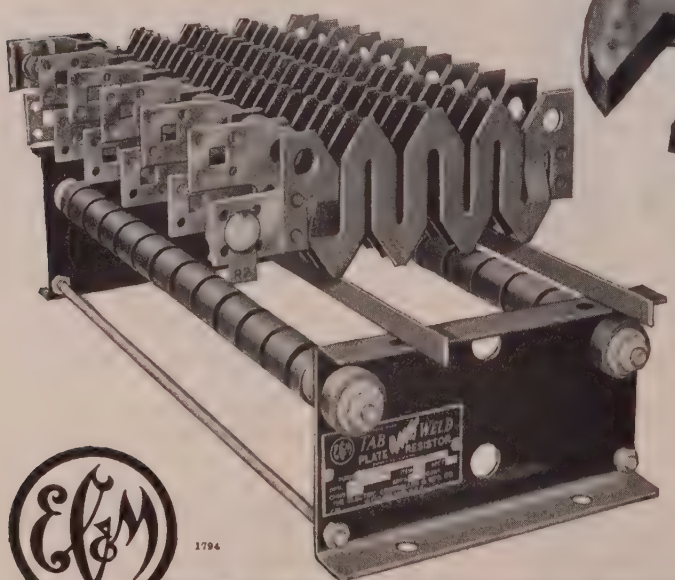
Hands Off!

EC&M TAB-WELD RESISTORS REQUIRE MINIMUM MAINTENANCE

Only EC&M TAB-WELD Plate Resistors are both bolted and welded for constant current path. Unlike other resistors, they do not require periodic tightening of clamping nuts to compensate for loss of pressure caused by alternate heating and cooling. In TAB-WELD Resistors, grids are offset and mating ends spot welded. Tap-plates are also welded into place at close intervals along the grid assembly.

This exclusive EC&M construction offers these outstanding advantages: (1) stabilized ohmic value, (2) no burning at grid-eyes or at tap-plates, (3) easy tap-shifting for best motor performance, and (4) long life with negligible service.

So . . . hands off EC&M TAB-WELD Plate Resistors . . . they are constructed for dependable performance on heavy duty motor applications . . . with minimum maintenance!



CHECK THESE ADVANTAGES!

- Nonbreakable
- Corrosion-resistant alloy steel
- Negligible resistance change between cold and maximum working temperatures
- Offset resistor ends spot-welded
- No burning at grid eyes
- No burning at taps
- Small adjustments in resistance value easily made
- Insulating spacers remain dimensionally stable
- No periodic tightening of clamping nuts
- All standard sections same size
- Double insulation to ground
- Fast connection to any tap plate

Write today for illustrated Bulletin No. 942-B for complete data on EC&M TAB-WELD Resistors.

1794

THE ELECTRIC CONTROLLER & MFG. CO.

2698 EAST 79TH STREET • CLEVELAND 4, OHIO

Let's Create Confidence

A swing around the spring convention and show circuit, including steel, machine tools, material handling equipment, small tools and industrial supplies and industrial advertising and promotion, brings proof that a change from pessimistic to confident thinking has taken place among American businessmen.

Last year, most metalworking executives were reporting the biggest volume of business in history. At the same time they were worrying about high taxes, government intervention, big inventories and rising costs. Most of all they were worrying about the next great depression.

This year they were saying: Selling is tougher and business is off 5 to 20 per cent. Or, sales are ahead of 1953. Prices have cracked a bit but there are no open breaks. Defense work is down but it's not too profitable anyway. Wages are up but there's less overtime and productivity has increased. Profits are off but not too badly. The readjustment is a good thing for everybody.

What the convention speakers and hallway gossipers have been reporting is confirmed with an added dash of optimism by the midyear forecast just conducted by STEEL's editors among several thousand metalworking executives. Half of those reporting expect 1954 business will equal or exceed that for 1953. Three of four expect second half of 1954 will be as good or better than first half. Metalworking volume for the year at $113.1 billion will be off 10 per cent from 1953. It still will be the second best year on record by a wide margin.

The adjustments of the last eight to ten months appear to have been part of one of the mildest recessions on record. There's been less time wasted on worry and more spent on planning and acting. Over half the metalworking companies reporting are planning new products. Hard selling has brought in more new customers for two of every three companies. One of four will expand capacity through new plants, plant additions and new equipment.

Everywhere, men are expressing confidence and acting to create confidence. If you're one of the minority that's still worrying about business, why not take a look at the facts and perhaps you will want to help create confidence, too!

Irwin H. Such

EDITOR

MORE ON TITANIUM: Anyone disposed to wade through 791 pages of the hearing report on titanium issued by the Senate Minerals, Materials and Fuels Economic Subcommittee can only conclude that big things are yet to come in this wonder metal's future.

After the hearing Chairman George W. Malone (Rep., Nev.) said he was convinced that the U.S. needs 150,000 tons of titanium annually, yet annual production is only about 2000 tons

and Defense department goal is only 35,000 tons.

Actually, capacity will be in place by year end to produce 7200 tons annually. Also, Electro Met plans a 10,000-ton plant using a reducing agent other than magnesium. In Canada, Shawinigan Water & Power Co. says it has a new lower-cost electrolytic process. In Cleveland, Horizons Inc. has an electrolytic process.

So, the story of titanium continues to unfold. Chapter-by-chapter, it will make fascinating reading (p. 66).

* * *

COMEBACK FOR CHRYSLER: If we interpret correctly what Detroit Editor Floyd Lawrence didn't say in Mirrors of Motordom (p. 69) this week—and we think we have—you can definitely expect Chrysler to come back fighting for its usual share of business in the new model year.

At its new Chelsea, Mich., proving grounds Floyd saw some of the models Chrysler may put on the market in the future, including a turbine-powered Plymouth. To the average owner this is more important: He doesn't expect to drive a car for 24 hours at an average of 118 miles per hour as Chrysler does at Chelsea. But, he likes to have the feeling that he could.

It would be a good bet that Chrysler will supplement endurance with good styling, too.

* * *

ENCOURAGE SELF-RELIANCE: There are a great many award programs designed to stimulate and encourage young folks to become good and useful citizens.

But, a new one in Middletown, O., has a special appeal. It recognizes students who develop self-reliance during high school days.

Originator and sponsor is W. W. Sebald. As a teenager he delivered laundry, played in a dance band and was an office boy—on the way to the presidency of the Armco Steel Corp.

He thinks that what people do with their time when they are young is a good indication of what they will do with it later, that our nation will be secure only so long as its citizens are industrious, self-reliant and co-operative.

Two hundred and ten of 500 Middletown seniors applied for the award. Twenty finalists competed for eight prizes ranging from $50 to $400. Top girl winner has been leaving school at noon to work as a stenographer, later as a waitress, in supporting her ill mother. Boy winner gets up at 4:30 a.m. to milk cows on the 167-acre farm he helped develop.

Mr. Sebald's program is one well worth checking as a possibility for your community.

* * *

SITUATION NORMAL: The emotionalism generated in Pittsburgh where steel wage negotiations ran into a snag last week should not be taken too seriously. The union's refusal of the first industry offer is no more important than the industry's rejection of the union's original high demands. Both (p. 59) are accepted steps in the bargaining process.

Neither the union nor the industry wants a steel strike. Neither the union nor the industry wants to tear down the good relationships built up during the past two years. Both want to preserve labor-management "statesmanship." Chances are good that a settlement will be reached without a strike.

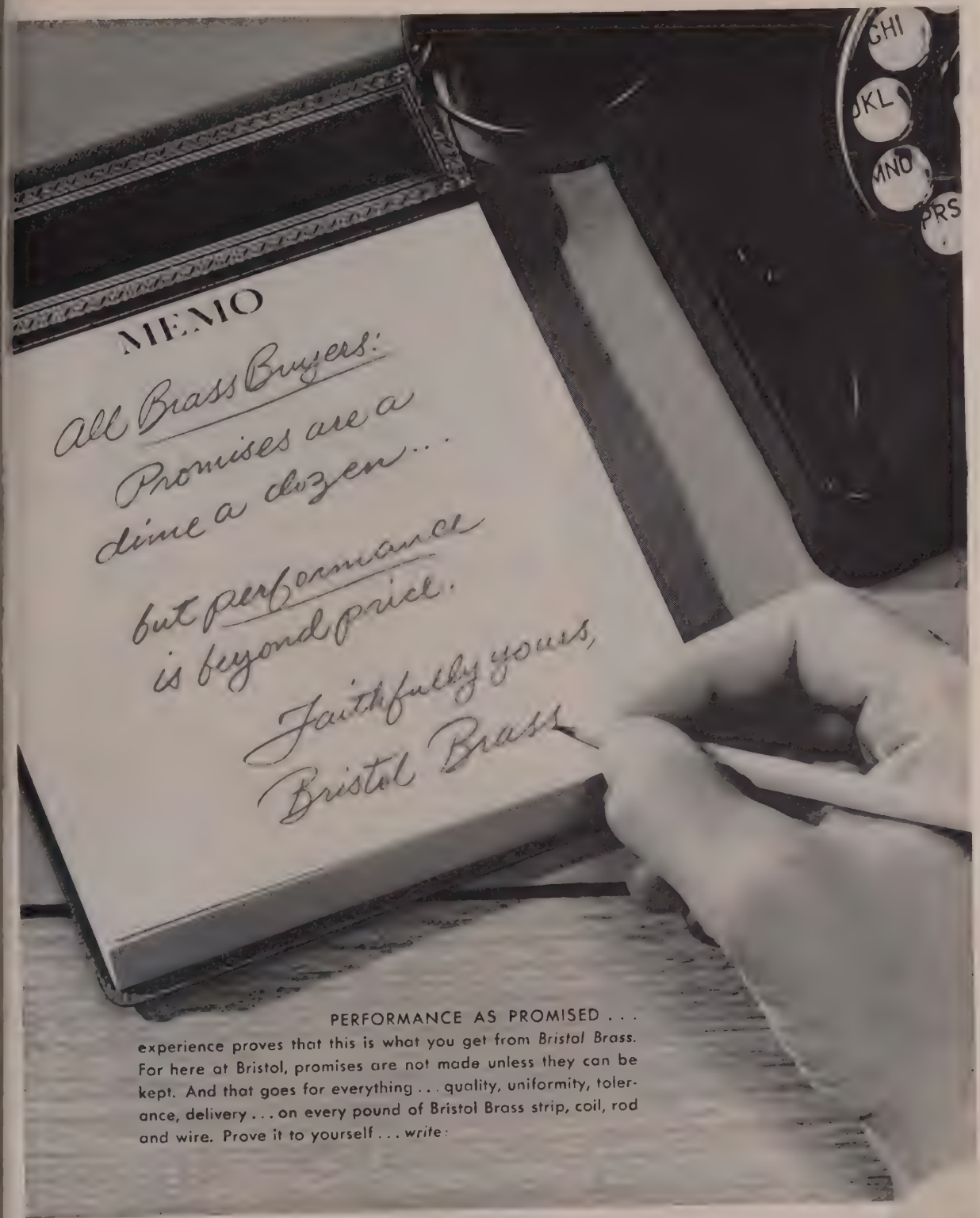
* * *

GOOD NEIGHBOR: Speaking before the National Industrial Advertisers Association in Montreal, Canadian Minister James Sinclair asked these simple questions: What do you do with your best customer? Do you antagonize him? Ignore him? Irritate him with pin pricks? Or do you cultivate his goodwill and try to make him a still better customer?

The U.S. and Canada are each other's best customer. Last year, the U.S. sold $3-billion worth of goods to Canada, more than to all Western Europe and more than to all Latin American countries. Canada sold the U.S. $2.5-billion worth or 60 per cent of its total exports. Canada needs U.S. manufactured goods. The U.S. is highly dependent on Canada for vital basic metals, lumber, asbestos and newsprint.

What bothers Minister Sinclair is possible return of U.S. and Canadian policies in the last depression that virtually amounted to trade warfare. It was not until 1935 and 1938 that excessive trade barriers were removed and more normal trade resumed.

Lately, he notes that both the U.S. and Canadian governments have been subjected to protectionist pressures from industry. In the U.S. there has been the tendency to yield a little here and there on particular products. Canada has not raised any tariffs since before the war. One of Minister Sinclair's questions should be repeated: Should the U.S. deliberately antagonize a badly-needed neighbor?



PERFORMANCE AS PROMISED . . .

experience proves that this is what you get from *Bristol Brass*. For here at Bristol, promises are not made unless they can be kept. And that goes for everything . . . quality, uniformity, tolerance, delivery . . . on every pound of Bristol Brass strip, coil, rod and wire. Prove it to yourself . . . write:

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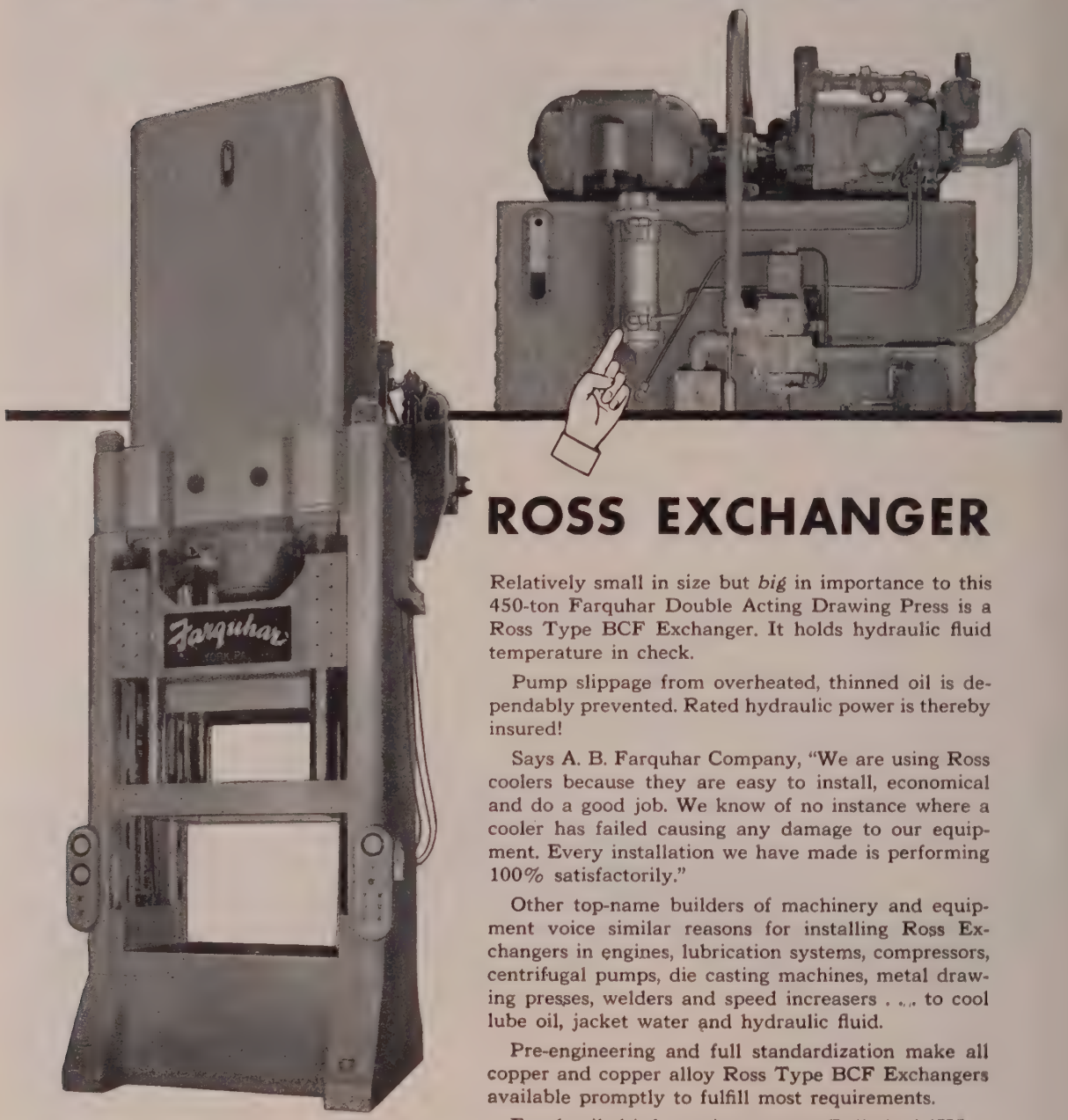
has been making Brass strip, rod and wire here in Bristol, Connecticut since 1850, and has offices and warehouses in Boston, Chicago, Cleveland, Detroit, Milwaukee, New York, Philadelphia, Providence, Rochester. The Bristol Brass Corporation of California, 1217 East 6th St., Los Angeles 21. The Bristol Brass Corp. of Ohio, 1607 Broadway, Dayton.

"Bristol-Fashion" means **Brass at its Best**

Cooling oil to insure rated hydraulic power of this 450-ton Farquhar drawing Press



ROSS EXCHANGER

Relatively small in size but *big* in importance to this 450-ton Farquhar Double Acting Drawing Press is a Ross Type BCF Exchanger. It holds hydraulic fluid temperature in check.

Pump slippage from overheated, thinned oil is dependably prevented. Rated hydraulic power is thereby insured!

Says A. B. Farquhar Company, "We are using Ross coolers because they are easy to install, economical and do a good job. We know of no instance where a cooler has failed causing any damage to our equipment. Every installation we have made is performing 100% satisfactorily."

Other top-name builders of machinery and equipment voice similar reasons for installing Ross Exchangers in engines, lubrication systems, compressors, centrifugal pumps, die casting machines, metal drawing presses, welders and speed increasers . . . . to cool lube oil, jacket water and hydraulic fluid.

Pre-engineering and full standardization make all copper and copper alloy Ross Type BCF Exchangers available promptly to fulfill most requirements.

For detailed information, request Bulletin 1.1K5.

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Metalworking Management Sees Second Half Upturn . . .

- PRODUCTION VOLUME WILL RISE
- EMPLOYMENT WILL PICK UP
- SELLING PRICES WILL BE STABLE
- MANUFACTURING COSTS WILL HOLD
- DISTRIBUTION COSTS WILL INCREASE
- METALWORKING CUSTOMERS INCREASE
- CAPACITY CONTINUES TO EXPAND
- MORE NEW PRODUCTS PLANNED

Next Six Months . . .

THE TURNING POINT in industry's economic adjustment is past. The trend for the second half of 1954 is upward.

That is the consensus of metalworking executives replying to STEEL's Midyear Business Conditions questionnaire.

This magazine, believing the best judges of how fast industry's wheels will turn are the men who make those wheels turn, asked 5039 metalworking management men for their expectations. They covered business volume, employment, price and cost trends, and plans for expanding capacity and introducing new products.

Results are shown in accompanying charts.

Optimistic—Three of four expect their business volume in the second half this year will equal or exceed the first six months.

But Volume For Year Will Be Down From 1953

The net increase in volume expected for the second half is a substantial 10 per cent.

Volume for the whole year will be less than in 1953,

1954 Will Be Metalworking's Second Largest Year In Sales

METALWORKING MANAGEMENT EXPECTS

Employment To Increase

31.1% MORE WORKERS

25.2% FEWER WORKERS

43.7% NO CHANGE

Capacity To Expand

28.0% WILL INCREASE CAPACITY

72.0% WILL NOT INCREASE CAPACITY

Of Those Planning Capacity Increases

56.4% WILL ADD LESS THAN 10%
31.9% WILL ADD 10–25%
11.7% WILL ADD MORE THAN 25%

14.4% WILL BUILD NEW PLANTS
41.4% WILL BUILD PLANT ADDITIONS
80.1% WILL ADD NEW EQUIPMENT

New Products To Be Introduced

50.8% NEW PRODUCTS

49.2% NO NEW PRODUCTS

but half the companies replying to STEEL's questionnaire expect their volume will be as good or better than it was last year.

Second Best Year—STEEL's projection of metalworking sales for 1954 is $113.1 billion, down about 10 per cent from 1953, but well above any prior year. The metalworking industry includes primary metals, fabricated metal products, electrical machinery and equipment, machinery other than electrical, transportation equipment, and instruments. Ordnance is not included except where it falls in one of the foregoing categories.

Tone: Firm—Hundreds of respondents supplemented their answers to the questionnaire with comments. An overwhelming majority express expectations of better business ahead. A few indicate planning already is underway for a new wave of expansion.

A Midwest metal fabricator says: "We anticipate a vast growth in our market in the late 1950s and early 1960s. Consequently, we are preparing our organization and facilities now to take full advantage of it."

An Ohio manufacturer of material handling equipment writes: "We notice a 'firming' of business activity. After a slowdown in the last quarter of 1953, activity was low in the early months of 1954. Sales, however, are picking up and the remainder of 1954 appears to be encouraging."

A nonferrous metal producer in Pennsylvania comments: "Our business characteristically leads (in time relationship) general business conditions. Our slump started last fall, hit a low point in January and February. We are now heading upward at a significant rate."

A machine and tool producer in Ohio: "Orders for the second half of 1954 and early 1955 are the largest ever held by this company. From all indications, the period from now through April, 1955, will surpass any previous year."

A Wisconsin foundry and machine works: "We believe the year 1954 in its entirety will be about 10 per cent better than 1953."

Some Down—Although most comments express substantial optimism, a minority of respondents see their business continuing to slide off during the second half. This particularly is true of companies which have engaged largely in defense work. With military contracts being completed, cut back or stretched out, such firms find the sledding rough.

A New York screw machine product company says: "Our business is off 25 per cent. We see no marked increase for the remainder of the year."

A Missouri fabricator writes: "A large part of our output has been going to the armed services. Buying has been almost completely stopped. For these reasons, maybe we are not a 'normal' company."

A Michigan fan manufacturer: "Incoming business is less than outgoing shipments. We expect trend to continue and expect second half business to be 5 to 10 per cent lower than first six months."

Employment To Gain—The general expectation of

igher dollar volume in the second half is supported y plans to maintain or increase working forces. 'hree-fourths of the companies expect to increase heir employment or to hold at present levels. Only 5 per cent anticipate any decreases.

Many respondents point out they have eliminated r minimized overtime work with resultant cost savngs. Some of the planned increases in employment luring the next six months are predicated on mainaining a near-normal workweek in the face of proluction increases.

Complaints on low productivity of workers still are made, although these occur less frequently than n previous studies. A few instances are cited of workers deliberately stalling on the job to prevent layoffs or shorter workweeks.

Selling Aggressively — Many companies reporting gains in the first six months and anticipating further gains in the second half attribute their success to more aggressive sales efforts.

"It's a darn healthy thing for us to be selling again," comments a Massachusetts fabricator. "We expect a 10-per-cent gain for the second half and should show a 20-per-cent increase for the year over 1953."

A Midwestern enamel products company reports: "We started national advertising in 1953. It has been of great help to us. We are increasing our advertising budget for next year."

A Chicago manufacturer writes: "We determined last fall to get back to aggressive selling. We cut out the deadwood in our sales department, instituted a vigorous sales campaign. Our volume is running 15 per cent ahead of a year ago, although many of our competitors are crying. We expect to continue to increase our share of a constantly growing market."

Prices Under Attack—Although prices generally have remained firm, manufacturers report they are constantly under attack, have weakened in some instances. More than three-fourths of the respondents expect selling prices will remain firm through the second half and a few anticipate increases, particularly if steel prices are increased as a result of the steel wage settlement. About one in four expects prices to weaken.

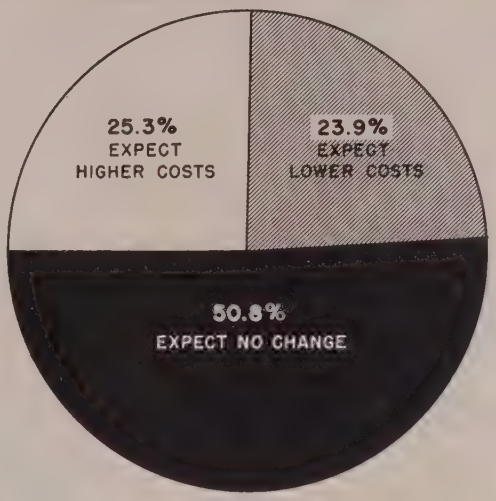
A Detroit auto partsmaker says: "Physical volume in the second half will exceed that of the first half, but prices will be definitely lower on 1955 model automotive parts."

"Buyers are price conscious and go from plant to plant seeking cut rates," reports a Philadelphia partsmaker. "The purchasing agent is the head man."

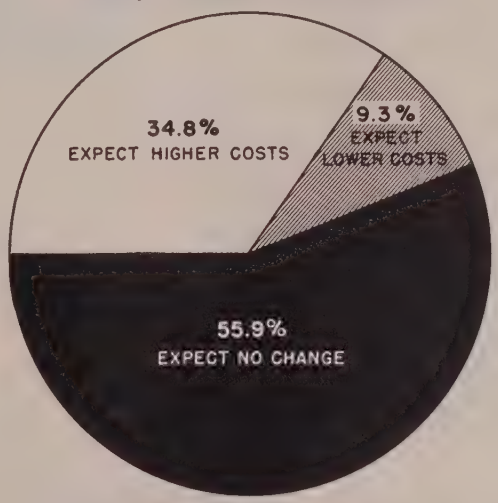
An Ohio tool and die company finds: "Product manufacturers have to be shown how a retooling program will cut their costs. Competition for work is keen and prices are shaved to narrow the profit margin."

A California components manufacturer says: "If steel can be purchased at the same price during the second half, we will hold our prices at present level;

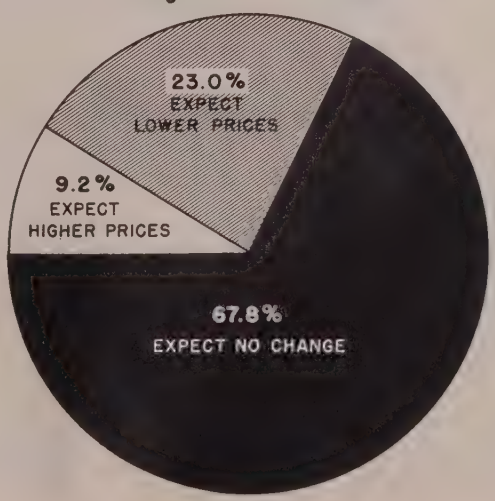
Manufacturing Costs To Hold



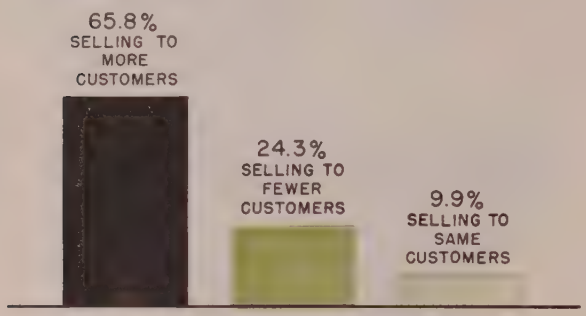
Sales, Distribution Costs To Rise

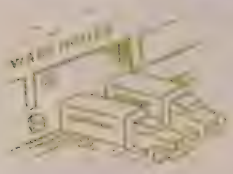


Selling Prices To Be Stable

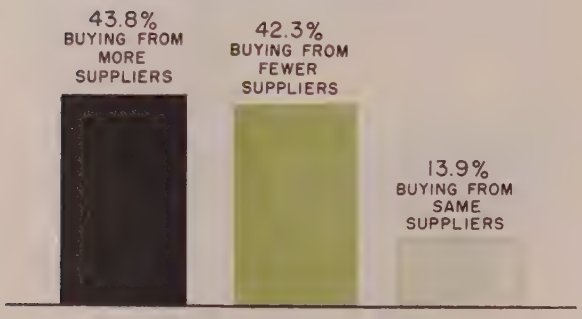


Selling To More Customers in 1954 Than in 1953





Buying Practices Change



if steel prices go up, our prices will have to rise."

Squeeze on Profits—A large number of companies find the pressure on prices, and fairly inflexible costs are making for a high break-even point. Profits for many companies are lower.

A Minnesota engineer puts it this way: "Business is good but we are not making any money."

A Midwestern firm reports: "We fabricate structural steel for building construction, and prices as a whole are too low. In fact, profit is becoming nonexistent."

A Michigan auto partsmaker: "We expect 1954 will be a good year for us volume-wise despite the fact that profit is somewhat lower."

A New York nonferrous smelter says: "Our profit margins are being cut considerably to keep sales up to previous volume. Even if demand increases in next six months, we predict a profitless prosperity."

An Ohio manufacturer welcomes the tighter profit margin: "Business has made terrific profits during the past two years . . . It is time to set a completely realistic figure of profit and to start working toward the betterment of the economy."

Costs Trimmed—Narrowing profit margins are intensifying interest in reducing manufacturing costs. Few companies expect to be able to make substantial reductions in manufacturing costs. Only one in four respondents anticipates any reductions. About the same number expects increases as result of some wage and material increases.

A Southern California tool company says: "We are making every effort to reduce labor costs by the use of new and more efficient tooling and production methods and by improved purchasing procedures."

A Minnesota stove manufacturer: "We have eliminated completely all government controlled work. The time and energy thus saved is being devoted to increasing efficiency of our plant operations, with resultant cost cutting."

An eastern seaboard shipyard: "We are small shipbuilders with building costs way below average. Our business could be expanded by 50 per cent in the next year if we could keep our costs down. We plan to expand gradually and keep costs under control."

A Chicago fabricator: "We are paring our production costs and in some cases will make in our own plant items we formerly subcontracted. We hope to maintain our dollar sales volume at the same level we had in 1953, even though prices are slightly down."

New Product Weather—A flood of new products will hit the market during the latter half of this year and early in 1955. More than half of the responding companies say they have new products in the development or early production stages. Many are alien to the company's former lines.

Attention to diversification was prompted by withdrawal by many companies from defense production and the need to find use for capacity thus freed. The downtrend last fall and early in 1954 encouraged work on ideas held up during the production-pressured postwar years.

A builder of trailers in Kansas says: "We have two brand new products on which we will begin rolling in the next six months."

A Massachusetts electrical goods company: "Our volume is off from 1953, but we expect the introduction of several new products to boost it back up again. This may not take effect until 1955."

An Illinois fastening equipment maker: "Volume from regular customers is off. We are adapting our machines to new uses. Our customer list has been doubled in the last year as a result."

A Midwestern agricultural equipment company: "We have just completed a 30-month Navy contract. We are now developing new consumer products."

Vice president of a California engineering company sums up the situation this way: "In my opinion companies that make technological improvements in 1954 cannot help but expand. New products are the prime essential—good, sturdy, dependable items and not gadgets."

NEA

McDonald and Stephens keep on negotiating because . . .

Situation Normal in Steel Labor

The union's name-calling fit last week is just part of the usual negotiating proceedings, so don't be alarmed about strike chances. A deadline extension is possible

DON'T become too alarmed over the possibility of a steel strike. The sound and the fury emanating from steel wage negotiation headquarters is only normal.

That is the advice from veteran labor observers after the United Steelworkers wage and policy committee turned down U. S. Steel Corp.'s first settlement offer and authorized its officers to take "whatever action they deem necessary."

While a strike is possible, it is not considered probable. More likely is an extension of the present contract, a continuation of bargaining and eventual peaceful settlement.

Procedure—Normal procedure in wage negotiations is this: First the union presents demands far in excess of what they expect to get. Often the demands verge on the ridiculous.

Second, the company receives the demands and takes time out to study them.

Third, the company makes a counter offer. That offer is lower than the union will accept and lower than the company expects to eventually give. It is a sort of antidote for the first high demands by the union.

Fourth, the stage is now set for table pounding and name calling by union officers. That impresses the union membership. Sometimes it impresses the public. It is accepted as a part of the American system of free collective bargaining.

Fifth, the preliminaries being over, the parties sit down to real collective bargaining sessions in which each side attempts to gain the most favorable possible settlement.

The Offer—Officially, neither company nor union will define the offer made by the company. Unofficially, it was said to comprise pension-benefit liberalization, minor improvements in insurance and a small wage advance. On a slightly larger scale, those concessions likely will be the basis for the eventual settlement.

The guaranteed annual wage is regarded as a dead issue for 1954 bargaining, although the industry may agree to a joint study committee and a reopening for consideration of the issue at next year's talks.

Pending more definite progress in the negotiations with U. S. Steel and the other larger companies, union negotiating committees meeting with the smaller companies are stalling. In many cases the local negotiating committees have not even revealed what their demands are.

Prices — What will happen to steel prices after a wage settlement is reached is luncheon-table and corridor conversation for both steel producers and steel buyers. The industry is reluctant to increase prices in the face of short-of-capacity demand. But its ability to absorb added costs is made extremely difficult by the heavy financial obligations incurred in expanding capacity.

A rule-of-thumb in the industry is that a 5-cent wage increase necessitates a $2-a-ton price increase. Should the wage settlement be made on the basis of an 8-cent-an-hour package, a compensating price increase is possible.

Cole To Be CIO-AFL Umpire

David L. Cole, Paterson, N. J., attorney and former head of the Federal Mediation & Conciliation Service, has been named impartial umpire of AFL-CIO jurisdictional disputes.

His job will be to referee disputes on raiding that come up among parties to the AFL-CIO no-raid pact (STEEL, June 21, p. 65). The treaty now covers 65 AFL unions and 35 CIO affiliates with a claimed membership of about 10 million, some two-thirds of all unionized workers. The pact runs to Dec. 31, 1955.

Conspicuous nonsigners of the treaty were CIO steelworkers and AFL teamsters and carpenters.

Business Adjustment Without a Squeak

Centralized lubricating system manufacturers have increased shipments despite the current business adjustment. Missionary work begins to pay off

BEING A MIXTURE of missionary and college professor is paying off for manufacturers of centralized lubricating systems. Shipments for most firms in the industry have continued a gentle upward trend right through the current business adjustment.

There's still a lot of missionary work to be done though. One manufacturer estimates that not more than 15 per cent of the machinery in use today is equipped with centralized lube systems.

No New Horses—The same missionary-professor approach which has converted that 15 per cent is expected to turn much more of industry to CLS. Manufacturers of such systems are not changing horses on their sales efforts this year. What they have to sell is lubrication without the element of human error. Automation, continuous production lines and the desire to cut downtime all work in favor of automatic lubrication.

By now, every one of the leading half-dozen CLS manufacturers has stories to tell of the first installation in a new industry which sold another which in turn sold more. Amazing performance on one rolling mill, for example, sold a centralized lube system on another older mill within the past month even though the general halt order was out on any new equipment investments in that plant. The superintendent felt confident he could override the general order on the basis of the experience with the first mill.

General Awakening—The steel industry is one which is pretty well sold on CLS. So is the automotive industry. The coal mining industry is sold on the idea but is not a terrifically active market at present for obvious reasons. Food machinery users are good customers; papermakers are becoming so. The textile, chemical and lumber industries are hearing the word preached on CLS and first installations are going in.

Note that the industries listed above are all user industries. CLS manufacturers found that machinery users were easier to sell than machinery builders. Only when the customers began specifying centralized lubrication did the idea catch on with builders.

Work To Be Done—Even today, centralized lubrication is standard equipment on few machines. In most cases CLS can be had as an accessory; in some cases the machine will have been redesigned for CLS, and it can be had as a component. That's the situation because machinerymakers are loath to add anything which will add to the selling price of their products.

Manufacturers of CLS counter that argument by saying they can show manufacturers the advantages of proper lubrication which make costs secondary.

Dollar Talk—Industrywide sales of CLS run between $5 million and $10 million annually, depending on what you include as a centralized lubricating system, with replacement sales running between 5 and 10 per cent of that total. Equipment costs from $4.50 to $20 per bearing on semi-automatic oil or grease systems or about 1 per cent of the cost of large machines to 4 per cent of smaller ones. But those are just rough yardsticks.

Makers of the equipment are so sure that cost savings resulting from their apparatus outbalance so substantially the price that they foresee 10 to 20-per-cent gains in shipments this year over last.

High-flying Steel

Steel reinforcing bars arch skyward at Lambert Municipal Airport, St. Louis, where that city is building a $1.5-million hangar. Laclede Steel Co., St. Louis, is furnishing the bars

BDSA Hears Componentmakers

Manufacturers of mechanical power transmission equipment (gears, sprockets, clutches) took BDSA at its word and told it what the government could do to help the industry prepare for future mobilization. Business & Defense Services Administration representatives heard the industry ask for three main things:

1. Realistic government specifications on such items as gears. By calling for closer tolerances than are necessary, the government is reducing the field of procurement and complicating total production capacity of the industry.

2. Equal status with prime contractors in obtaining plant equipment from government pools. As it stands now, subcontractors must get a prime contractor to sponsor requests for government-owned equipment. Since a sub often works for several prime contractors such sponsorship is frequently difficult to obtain.

3. A special code classification for transmission chain and sprockets. Manufacturers of such items contended that, since their products are used so widely by defense producers, availability of alloys and carbon steels which meet required standards should be assured for chain and sprockets.

Republic Steel Wins Court Case

Republic Steel Corp. has been absolved of patent violations in its court battle with Cold Metal Process Co., Youngstown.

The two Steckel patents which Republic was charged with having violated involved the use of roller bearings on the roll necks of the backing rolls of a 4-high mill, and the use of this mill with

ension on the steel strip being olled. The court decided in favor of Republic due to the fact that the company purchased its mill from United Engineering & Foundry Co., which had been licensed by Cold Metal Process Co. to make, use and sell mills of the type involved.

The suit was filed in 1942.

Studebaker-Packard Corp.

The third auto merger in a little over a year is a virtual cinch. Packard's Nance will be chief

THE LAST unmarried independents are betrothed, as directors of Studebaker and Packard approved consolidation into Studebaker-Packard Corp. last week.

Subject to approval of the stockholders of the two firms Aug. 17, there seems little doubt that the move will be made creating the third new "fourth-largest" firm in the auto industry in a little over a year.

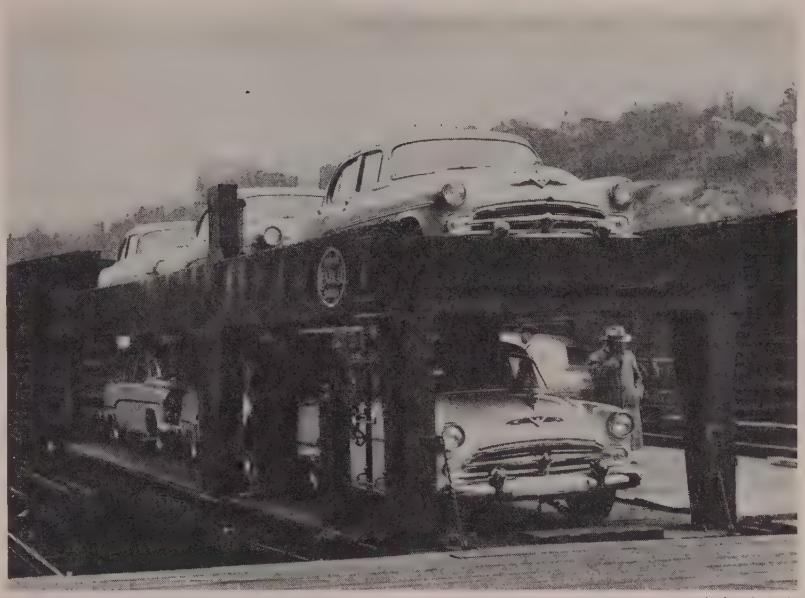
Nance at Helm—Under the terms of the proposal, Packard will purchase the assets of Studebaker Corp. through a stock exchange deal. James J. Nance will become president and chief executive officer of the new firm with Paul J. Hoffman, chairman of the board, and Harold S. Vance, chairman of the executive committee.

Officials of the proposed firm plan to maintain executive offices in Detroit and South Bend, although moves to integrate engineering and manufacturing of the two firms will be made as soon as the consolidation is approved. Asked to elaborate on what steps might be taken, Mr. Nance declined specific comment, pointing out that the factor of growth and fundamental economics would dictate the specific steps when the time came. Utilization of the new Packard transmission by Studebaker, now purchasing the Borg-Warner unit, was cited as one example.

Distribution Is Key—Of equal importance to the two firms in considering the consolidation are distribution implications of the move. Handicapped by incomplete lines of cars in achieving volume sales, Studebaker and Packard passenger cars are complimentary lines which can be handled by the present 4000 dealers of the combined organization. In addition to complete coverage of the passenger car market, dealers could also handle the Studebaker line of trucks which competes in a field accounting for 85 per cent of the total market.

For more on the distribution background of the consolidation, see Mirrors of Motordom, May 3, 1954, in which the consolidation was first predicted, and STEEL's Program for Management article on distribution, June 21.

Studebaker and Packard had combined assets of $253 million as of Apr. 30, 1954, with working capital of $87 million and net worth of $180 million.



Authenticated

Double-Decked Distribution

First shipment of automobiles aboard an unconventional carrier, the Evans Auto Loader, arrives in New York from Detroit. The double-decked carrier holds six autos (conventional box cars hold four) and is built on a standard 53-foot, 6-inch flat car. Cars are loaded and unloaded by a self-contained, powered elevating ramp. The Auto Loader is being tested on the New York Central's lines

New Orders, Deliveries Climb

Manufacturers' new orders and deliveries are climbing. That's the latest word from Commerce department's Office of Business Economics.

OBE says durable goods industries, hardest hit by the business decline, are being led in their comeback by the producers of heavy goods. Even so, finished goods inventories of durables are still going up; producers have managed to cut their working stocks somewhat. Right now, deliveries of durables are about 12 per cent lower than a year ago.

On the other hand, producers of nondurable goods have managed to cut both their finished goods and working inventories. And deliveries of soft goods are at about the same level as a year ago.

Low point in the slide of new orders came in January when durables were off a third from the May, 1953, high. In this time nondurables dropped only 5 per cent.

Unfilled orders have dropped continuously since September, 1952, but the rate of decline is now slowing. Currently, backlogs for durables are about 4 months of sales compared to 6 months a year ago and 2½ months in June, 1950.

Of a large sampling of manufacturers, 30 per cent of durable goods producers had higher business than a year ago. But for most (55 per cent) business was down 10 per cent or more. Of nondurable producers, almost half boosted their business, while slightly less than a third reported business off 10 per cent or more.

What To Expect If We Get Stabilization Controls Again

PLANNING of economic controls for a possible war emergency has entered a new phase—that of intensive review by the industries that would be affected.

Object is to make certain beforehand that the plans, if put into execution, will be workable. In particular, tailored price regulations are to be ready for immediate adoption when and if an emergency freeze is clamped on prices, wages and rents. Thus in the next emergency there need be no periods of confusion such as occurred between issuance of the general freeze order of January 26, 1951 and the subsequent issuance of tailored industry and commodity price regulations.

The current activity has given rise to rumors that economic controls are to be sought by the administration in the near future. That's not true. No price and wage controls are to be sought as long as the present normal conditions prevail.

All that's being done is planning the controls desired if an enemy struck. The President would make such use of these plans as he chose in asking Congress for powers to serve in an emergency.

Hotel Man in Charge . . .

The man directing the planning work is Glenwood J. Sherrard, Boston hotel owner, who is serving as assistant director for stabilization, Office of Defense Mobilization. He has started to form an organization of industry consultants who will review the existing plans—such as a possible 90-day freeze order, and the various regulations that were issued by the late Office of Price Stabilization.

He already has appointed David C. Holub as scrap consultant and Joseph F. Delaney as automotive industry consultant. Mr. Holub is president, Holub Iron and Steel Co., Akron, O., and president, Institute of Scrap Iron and Steel Inc. Mr. Delaney is assistant to president, Borg-Warner Corp., Chicago.

Other industry consultants will be engaged, care being taken in all cases to ensure that they are properly qualified. There will be consultants, for example, to advise on iron and steel price control planning, production equipment price control planning, etc.

NEA

GLENWOOD J. SHERRARD
. . . directs stabilization planning

How It Works for Scrap . . .

The planning philosophy is well illustrated in the case of iron and steel scrap. When the General Ceiling Price Regulation was issued in 1951, there was considerable confusion in the iron and steel scrap industry. It led to a partial breakdown of the flow of scrap not remedied until some time after issuance, on Feb. 5, of the ferrous scrap price order known as the Controlled Price Regulation 5.

Such a period of confusion can be avoided on the next occasion by having a counterpart of CPR 5 ready for simultaneous application with a general price, wage and rent freeze. That would enable Congress, at the request of the President, to launch a stabilization program without danger of a temporary drying up of the flow of scrap.

So an effort is being made to get CPR 5 into shape for possible future use. Thus far no need has been seen for any extensive changes in the regulation. CPR 5 was drawn up in accordance with the historical basing-point price system for ferrous scrap. It proved very effective in moving a maximum quantity of scrap at prices that were regarded as reasonable. At no time during the use of that regulation did the steel industry use the price of scrap as a basis for asking higher prices on iron and steel.

So far in the planning on CPR 5, only minor revisions have been made to take care of a few inequities uncovered by experience, to reduce the amount of administrative work and to make compliance more palatable to the industry. Right now principal attention is being given to the question of the price level, the need being for the lowest level of prices that would insure maximum flow of scrap.

Industry Men Needed . . .

That is the general approach to be followed in planning price control regulations for the other critical industries. Consultants will be briefed on their assignments, and it then will be up to them as to how they will form their judgments. In most cases there will be informal discussions with industry members.

Mr. Sherrard also is working on the blueprint for an effective organization that could be set up on call of the President to administer price, wage and rent controls. Such a plan would draw heavily on the key industries for competent men. The current redrafting of the whole stabilization setup is scheduled to be completed by the end of 1954.

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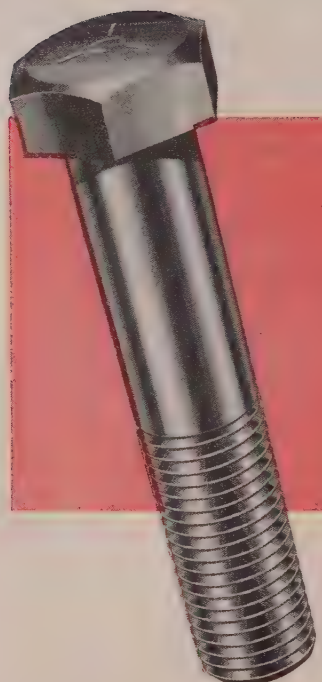

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Tariff Cuts Temporarily Stymied

The House passed a simple one-year extension of the Trade Agreements Act. The President has used up most of its tariff-cutting authority already. Issue is postponed

PRESIDENT EISENHOWER'S plans to further liberalize U. S. trade agreements was temporarily stymied when the House passed a simple one-year extension of the Reciprocal Trade Agreements Act of 1934 with amendments.

Passed only one day before the deadline for action on the bill, the one-year extension does little more than keep the issue of freer import tariffs alive for another year. Expiration of the law is now set for June 12, 1955. The Senate is expected to go along with the House action.

Out of Gas—The one-year extension also means the President has little hope of entering into any new agreements under the act in 1954-55. Only major agreement being considered currently is one with Japan which will take months to work out. By that time, expiration of the law will again be breathing down the administration's neck.

The extension does keep the issue alive, however. The President had asked for a three-year extension, as recommended by the Randall Commission report, in order to hold hearings and study the question at leisure. Now he'll have to cram those years of study into one. House Ways & Means Committee Chairman Reed has indicated a thorough study of foreign economic policy is on that committee's docket for next year too (see STEEL, June 21, p. 79).

Open Question—That the die is not yet cast on how much of the President's trade liberalization program will be accepted is shown by the jockeying which went on in the House over this bill. The House Ways & Means Committee turned back attempts to give the President more tariff-cutting powers as requested in connection with the bill. Conversely, a move by Rep. Carl T. Curtis (Rep., Nebr.) to give extra protection to the watch industry was also defeated.

What action is finally taken on the President's trade liberalization program will depend in large measure on what happens to U. S. import-export trade from here on.

Foreign Trade Picks Up in April

Merchandise exports of the U. S. in April, 1954, amounted to $1,420,900,000, up from March's $1,123,000,000 and above the first quarter monthly average of $1,132,000,000.

April exports of machinery and vehicles rose to $550,900,000 from $393,300,000 in March. Exports of metals and manufactures, except machinery and vehicles, rose to $116,600,000 in April from $80,600,000 in March.

Merchandise imports were $957,200,000 in April, 1954, well above both March imports of $858,000,000 and the first quarter monthly average of $833,060,000.

In the first four months of 1954, U. S. exports of commercial goods were $4.1 billion, about 1 per cent higher than a year earlier. Total exports including military aid shipments totaled $4.8 billion, about 9 per cent under the four-month period in 1953, mainly because of a substantial drop in U. S. military goods going to allies.

Imports over the first-four-months period of 1954 were $3.5 billion, about 8 per cent under the total for the like period in 1953.

Raytheon Gets Dollar Guarantee

Raytheon Mfg. Co., Waltham, Mass., has a guarantee from the Foreign Operations Administration that the company will be able to get its earnings from two new foreign licensees in dollars. FOA protection means Raytheon won't have to fear currency inconvertibility.

Of the two licensees, one in Germany—Atlas-Werke at Bremen—is to manufacture, lease and sell Raytheon commercial radar equipment and a Raytheon electronic device for measuring water depths by compressional echo waves. The other licensee—FIRAR (Fabbrica Italiana Raddrizzatori Apparecchi Radiologici), Genoa, Italy—is to manufacture magnetron and klystron tubes for domestic and export sales.

Fruition

First nonstop shipment of Ridgid pipe tools by Ridge Tool Co., Elyria, O., from Cleveland to Sweden was made possible through partial fruition of a long-term plan of the Swedish-American Lines. That steamship company started by betting $2 million at the end of World War II on two 8000-to-10,000-ton ships that export via the Great Lakes would flourish. The ante has now been raised to $8 million (8 ships) and the traffic out of Cleveland has grown to where full boatloads can be made up and shipped direct

More Records for U. K. Steel

British steel production in May, 1954, averaged 374,000 tons a week. That exceeds the previous output high of 368,300 tons a week set in April, 1954, and is well above the weekly average of 350,700 tons for May, 1953.

Outlook for export of British steel is improving with the reduction of plate prices. Some Continental producers raised prices on plates. British deliveries have been speeded up in last few months. So British producers look for strong export trade in second half, 1954.

Sylvania Electric Products Inc.

The demand for television hits a record as . . .

Electronics Industry Sees 1954 Sales of $5 Billion-Plus

LOOK FOR all-time record sales in the electronics industry this year of more than $5 billion.

Contrary to most other segments of metalworking which are down at least 2 per cent from 1953, makers of radios, television sets and other electronic equipment expect in 1954 to top the previous peak of $5 billion set last year and to be well above the World War II high of $4.6 billion, achieved in 1944.

The Picture—Retail sales of television receivers during the first four months of this year were at the highest point on record, Radio-Electronics-Television Manufacturers Association reports. Some 2,152,515 black-and-white sets were sold during the first four months, compared with 2,100,620 in the same period of 1953. Radio retail sales, excluding autos, were also high, although not a record—1,487,247 in the first four months of this year, compared to 1,851,673 in the first four months of 1953. Rising sales of radios since the start of the second quarter indicate that sales of those units for 1954 may not be far from 1953 volume.

The industry's other major market, the military, is also holding up well, delegates learned at RETMA's annual convention, in Chicago. Currently sales to the U. S. are running between $2.5 billion and $3 billion on an annual basis. The volume last year hit $2.8 billion. Manufacturers also are producing at about a $700-million annual clip on industrial and replacement equipment.

Foreign Aid—The industry is likewise doing well in foreign markets, despite rising overseas competition. Radio, television and electronics apparatus makers did $247.8 million in foreign business last year, up 18 per cent from 1952.

In toto, the industry expects to have sales of at least $1.3 billion in radio and television, $3 billion or more from the military and $700 million from industrial and replacement business. That all adds up to more than $5 billion.

Industrial Radio Rules Amended

The Federal Communications Commission has amended its rules to permit case-by-case exceptions to the rule that stations in the Special Industrial Radio Service must be located outside of standard metropolitan areas of 500,000 or more population.

Exceptions will be allowed where the applicant can demonstrate the existence of special circumstances, such as peculiarity in population distribution, terrain and directional antenna characteristics. This action is only in the nature of interim relief pending conclusion of present rule-making proceedings. The commission warns it should not be construed as a prejudgment of issues in that proceeding.

Wheeling Plans Second Line

Wheeling Steel Corp. will construct a second continuous galvanizing line for the production of galvanized sheets and strip.

The line, to be built for an estimated $4 million, will be at the company's Martins Ferry, O., plant, where last November the first such line was put into production. The new installation is scheduled for operation by May, 1955.

Titanium Plant for Electro Met?

Electro Metallurgical Co. and the government are close to an agreement that will enable Electro Met to build a $30-million plant to produce titanium sponge.

The company would erect the facility with its own funds, but the U. S. would contract to buy the output. The plant will have a capacity of 10,000 tons of sponge per year. Among the sites being considered is a 100-acre plot adjoining Electro Met's calcium carbide plant at Ashtabula, O., and adjacent to Linde Air Products Co. facilities. Both firms are Union Carbide & Carbon Corp. subsidiaries.

Electro Met plans to use a vacuum-furnace reduction method which it has developed to reduce rutile ore to sponge.

The government is also known to have had negotiations on new titanium sponge facilities with Dow Chemical Co., Monsanto Chemical Co., Horizons Inc., National Research Corp. and Western Pyromet Co. The two big U. S. sponge producers today are E. I. du Pont de Nemours & Co. Inc. and Titanium Metals Corp. of America. The Bureau of Mines turns out a small quantity yearly. Cramet Inc., a Crane Co. subsidiary, has contracted to build a sponge plant which will be ready by 1956.

Aluminum Marking O.K.'d

Aluminum Association approves proposed standards. Steel, copper groups still considering

ALUMINUM producers, through the Aluminum Association, New York, have notified the Standardization Division, Department of Defense, of their approval of the proposed standard for identification-marking of aluminum products at the mills.

The industry apparently stands ready to mark all its mill products—sheets, shapes, tubing, coiled wire, rods, etc. Certain minor revisions or clarifications have been suggested; these have to do largely with the question as to how the different products should be marked. The aluminum industry's communication will be studied by the three armed services.

Steel consumers are unwilling to commit themselves until they know how much the marking charge would add to the cost of steel. Most steel producers continue to study the problem and some of them are in contact with manufacturers of marking equipment. The copper and brass mill industry still has the matter under consideration.

To expedite the effort to get full industry approval, Defense department officials are considering a breakdown of the proposed marking standard into two parts, one for nonferrous and the other for ferrous metals.

The Air Force continues with its policy of placing orders for mill products with sources that will mark. That means a good deal of Air Force procurement is going to warehouses with marking equipment. The Air Force says that the savings in quality control operations and in salvaging scrap make it worth while to pay the warehouse extras in order to get material with identification marks.

Record Slag Output in 1953

The blast-furnace slag industry last year processed a record 30.5 million net tons of the mineral aggregate, valued at $40.1 million.

National Slag Association and the Bureau of Mines, which jointly gathered the figures, say that blast-furnace slag is produced in 15 states, but most of it is processed in Ohio, Pennsylvania and Alabama. As in the last several years, Ohio was again the largest producer.

So You're Going To Have a Company Picnic

PICNIC—an easy, pleasant or amusing time or experience.

That's a Webster dictionary definition, but it should provide the basis for blueprinting your company picnic. Picnics to be successful take careful planning and, if successful, they offer management a tremendous bargain in a labor relations investment.

Ingredients — Main ingredients are food and the program. Here are some ideas for your planning taken from a survey of 26 Cleveland-area firms by the Associated Industries of Cleveland.

Approximately half of the companies provide soft drinks and beer but have the employees bring their own food. The others range from providing hot dogs to elaborate buffets prepared by professional catering firms. Significantly, only one firm reported furnishing whiskey — and then only in limited quantities.

The Fun—Once the inner man is satisfied, he must then be entertained. Again, careful planning is a must. Most popular forms are contests for the adults as well as the youngsters, baseball competition between departments or married and single men, swimming, boating and similar activities. Some Cleveland companies offer prize drawings for such items as television sets.

Most companies prefer July and August as the months for their picnics. Saturday is the common day for picnics. When they are held in midweek, few firms pay workers for the time lost. Plant size plays an important part in the location; private groves are popular, but several Cleveland companies take employees to public amusement parks where arrangements for free rides and refreshments to employees are made.

The Bill—Costs vary, but AIC's survey average for the 26 companies was $2.43 per employee. The range was from a $1.40 low to $20.08 high. In some instances the union joined with the company in footing the bill as well as planning the entire outing.

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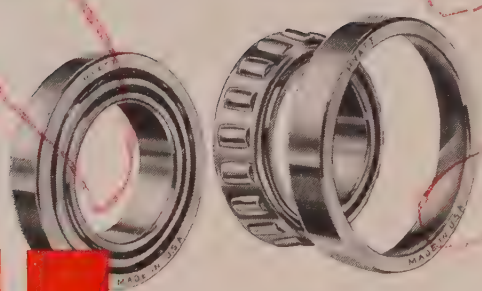

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HYATT

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Chrysler Extravaganza Reveals More Competitive Punch Coming

DETROIT

THERE'S no doubt about it—Chrysler has been nipping at hormones.

Reputedly the intellectual type, Chrysler tossed its glasses into the bushes and launched its new proving grounds at Chelsea, Mich., with a debutantish blowout featuring some of the hottest automotive and culinary smorgasbord to be served up in traditionally torrid press party history. Newsmen, normally smorgasbored to death, gulped, cheered and sat on the edges of their chairs during a day that will be talked about long after turbines are standard equipment on motor scooters.

Explanation—For the uninitiated, it should perhaps be explained that a press party is the calling together of newsmen by a company, often on the pretense that something newsworthy is happening. The only clear beneficiaries of most press parties are the newsmen whose livelihood is not necessarily enhanced by the ability to absorb press party benefits.

The Chrysler press party was a day filled with impressive events, initiated by getting out of bed at five-thirty to catch a special train for Chelsea. But arriving at the specially constructed grandstand on the edge of the 4.7-mile Chrysler track, newsmen witnessed what was probably the most outstanding event of the day. There a Chrysler New Yorker Deluxe was finishing the last five minutes of a 24-hour high-speed endurance run. It was obvious to a boy of seven that the car was not being driven by a grandmother on her way to church, but no one was prepared for the official AAA 24-hour cumulative average speed of 118.184 mph.

Strictly Stock — The car had been selected from factory stocks by AAA officials and was disassembled by them following the run and inspected to reaffirm its stock status. Using conventional tires and regular-grade gasoline, the car maintained its 118-mph average despite time lost in 26 pit stops for fuel and was averaging over 124 mph on many of its laps. Needless to say, that would have been a mighty good time for the Indianapolis jobs not many years ago.

A Requisite—Essential to the high speeds, of course, is the beautiful track banked to handle conventionally sprung passenger cars at speeds up to 140 mph without side thrust. Newsmen were given rides around the track and at an indicated 120 mph the chauffeur casually removed his hands from the wheel in the turns. The car promptly found the proper level for its speed in the turn and continued around with beautiful stability and better-than-human feeling for where it belonged.

In addition to the high-speed track hand-ground to 1/16-inch smoothness tolerances throughout its 4.7-mile length, newsmen were driven around the proving grounds and saw two concrete straightaway tracks, an 8.4-mile gravel endurance road maintained at a consistent level of roughness, three inclines with grades of 7, 15 and 32 per cent and a number of obstacle courses including a sand pit, water test trough and shake test strip.

Tester—Despite the differences in their nature, all of these facilities offer opportunity for accelerated component life tests under controlled conditions. Ten-thousand miles on the rugged endurance road, for example, equal about 100,000 miles of normal highway driving, and the flat-out

Auto, Truck Output

U. S. and Canada

	1954	1953
January	594,789	614,000
February	573,801	628,017
March	672,485	752,149
April	676,233	782,491
May	621,154	684,843
June		713,206
July		757,595
August		641,152
September		605,228
October		651,153
November		457,852
December		529,588
Total		7,817,274

Week Ended	1954	1953
May 22	157,993	162,447
May 29	148,774	125,868
June 5	119,688	134,879
June 12	139,312	167,095
June 19	141,878	170,357
June 26	138,000*	173,702

Source: Ward's Automotive Reports.
*Estimated by STEEL.

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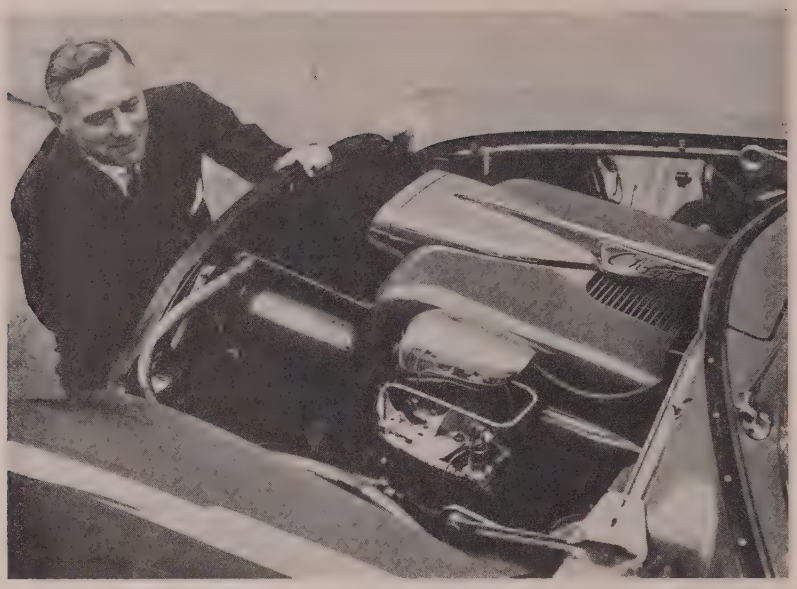


Chrysler's experimental gas turbine is given a final check prior to its first action demonstration before newsmen at the new Chrysler proving grounds near Chelsea, Mich. The turbine weighs nearly 200 pounds less than a piston engine of comparable power and neatly fits the engine compartment of a 1954 Plymouth

24-hour effort of the Chrysler New Yorker probably equaled about 50,000 conventional miles on its odometer.

The proving grounds does not make Chrysler free from road tests, since the grounds cannot duplicate differing climatic conditions. But control over the variables in pavement independent of the whims of county road commissioners and freedom from traffic to maintain prescribed average speeds make the proving grounds a valuable research tool.

Women, Too—In the afternoon Miss Betty Skelton shoved her dainty foot into a Dodge Firearrow to the tune of 143.4 mph for the first women's closed-course mark. The engine in the Euro-American closed-coupe style doodle was a Dodge sporting four pots, high-lift cams and a few other tidbits conniving to deliver about 225 hp pretty much at the speed Miss Skelton was driving. And as further proof that its dream cars have no feet of clay, about a dozen paraded in front of the stands including the new DeSoto Adventurer II, definitely not Hernando's Hideaway.

Next came Irish Horan and Joie Chitwood with their respective auto daredevils handling Plymouths and Dodges in two-wheel balancing acts, ramp-to-ramp jumps and spinouts calculated to scare sheet metal to death. Their introduction was somewhat novel: Six cars traveling down the track at about 60 mph criss-crossing with about two feet of bumper clearance, the cars almost going into a broadslide as they were whipped back and forth. The precision with which these boys handled their transportation pieces and the physical abuse the cars took in the ramp-to-ramp stuff with stock suspension lent considerable credibility to the announcer's plug, "If you're that good a driver, these are that good a car."

Turbine by Fall?—Moved up somewhat by a sudden rain shower was the appearance of the turbine-powered Plymouth in its first demonstration for newsmen. Actually there were two such cars at the track, and Chrysler is now building five more turbines, not all of which reportedly will go into conventional cars. Speculation is that a car similar to the beautiful turbine-powered Fiat is in the Chrysler fall future.

Perhaps the most unusual things about the turbine Plymouth was the word "turbine." The car appeared conventional and behaved much as you would expect any automobile to behave. One car which has just finished a fuel economy test at the proving grounds had averaged 14.9 miles per gallon at a constant highway speed of 40 mph.

Matter of Language—The official press release describes the sound of the car as "similar to a wind going through a pine grove." The release, however, does not make it clear that it was a mighty strong wind. Though the car doesn't exactly whistle, the similarity might be less picturesquely drawn to an asthmatic politician. The transmission selector provides forward, neutral and reverse, and the cars presently are equipped with test panels including such instrumentation as turbine inlet temperature, compressor outlet pressure, gas generator speed, fuel pressure and temperature indication circuits.

The car behaved in every way as a car should, including a demonstration by a young lady that the exhaust temperature was harmless. But somehow we wished the driver, George Huebner Jr., would mash the accelerator hard just once for a look at that turbine acceleration we've heard so much about.

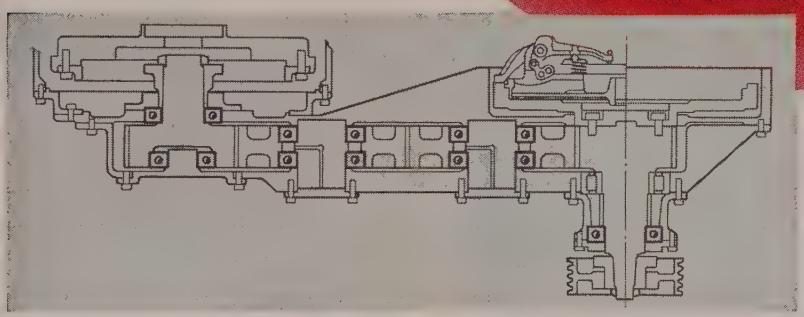
Power of Power Steering—Also impressive was a demonstration by Miss Sammy Chapin, sports car and aviation enthusiast, of a Dodge tractor-trailer rig in close maneuvering. After she had parked the trailer in a space one foot longer than its own length, maneuvered the truck through six barrels the length of the trailer apart and driven the truck through markers allowing only an inch clearance on either side of the wheels, Sammy revealed that she had never been in a truck until four days before. "Power steering," the daughter of Hudson Motor founder Roy Chapin explained when asked for her secret.

As to what the proving grounds dedication proved, Chrysler President L. L. Colbert summed it up in declaring, "This proving grounds is part of the Chrysler idea to improve the product, cut costs and sell harder and more effectively. No one in this organization has any illusions about what it takes to meet and beat competition."

Chrysler, indeed, has been nipping at hormones.

NEW DEPARTURES at work in Dart's new monster

This dual-engine giant has two torque converters, two transfer cases and two reverse gear boxes in which New Departure applications are found. Cross section of transfer case shows seven **ball** bearings—all New Departures!



Weight—50 tons! Payload—75 tons! It's Dart's mighty Monster, world's biggest truck; yet it's agile, too. Here's where New Departure **ball** bearings carry the loads . . . in the transfer cases, reversing gears and torque converters that deliver a 700-horsepower drive to tandem rear axles.

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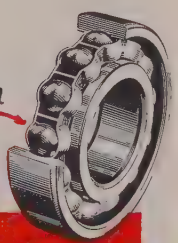

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SYRACUSE	2360 James St.	73-5195	**CHICAGO**	332 So. Mich. Ave.	Wabash 2-5875	**SEATTLE**	5000 First Ave., S.	Lander 5920
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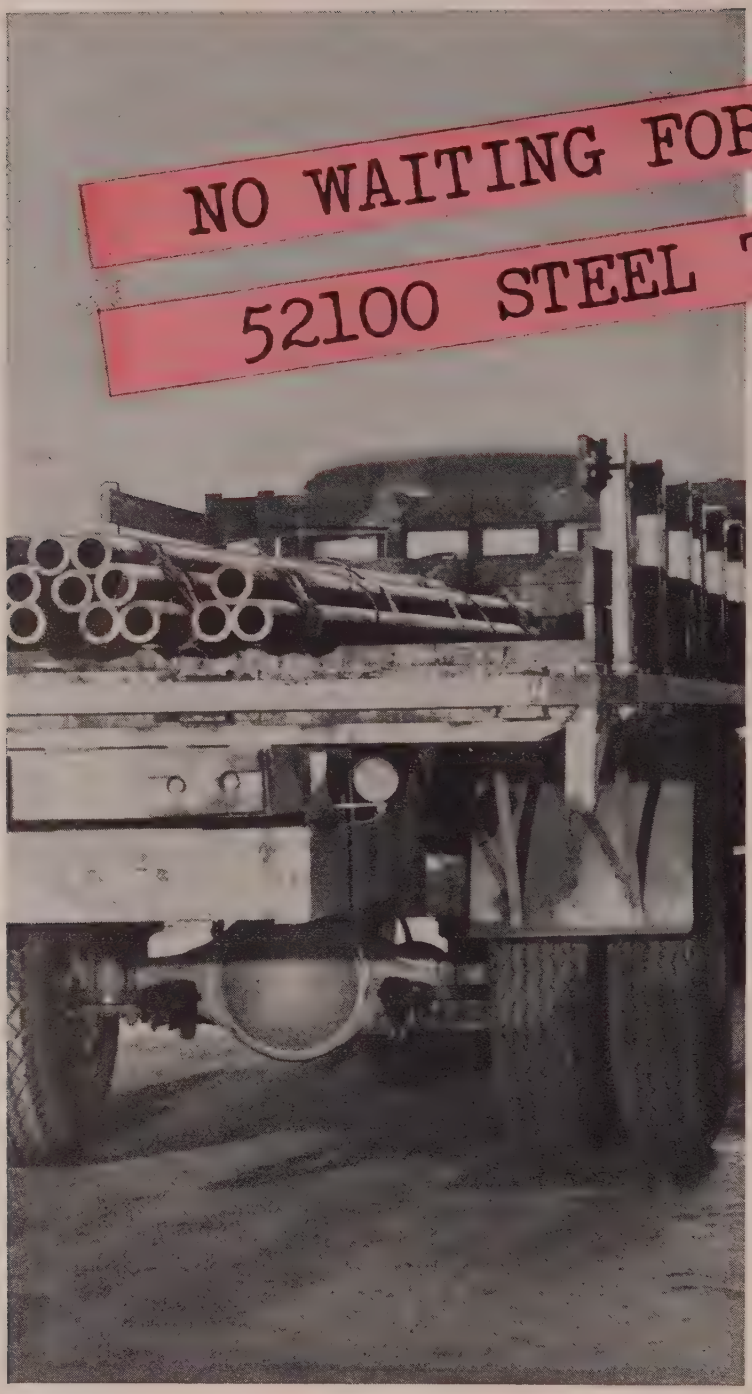

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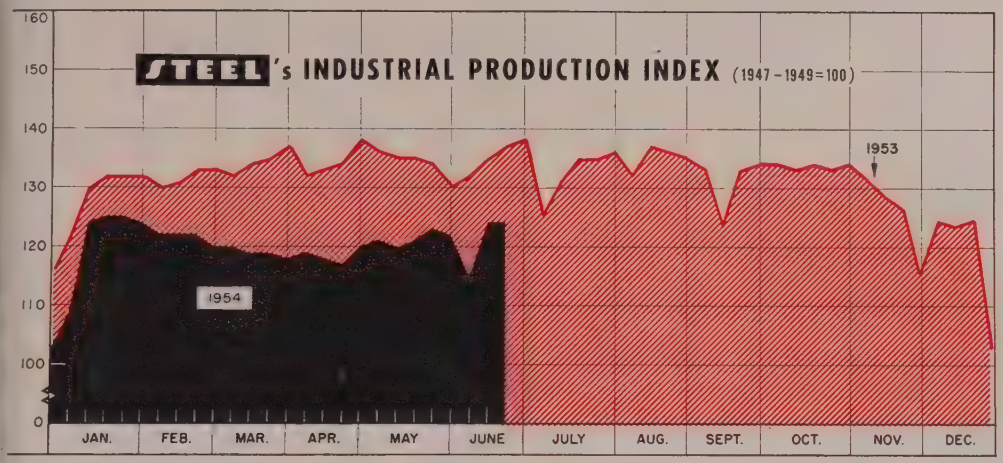


LATEST WEEK*	124
PREVIOUS WEEK	124
MONTH AGO	122
YEAR AGO	138

*Week ended June 19.

Based upon and weighted as follows: Steel Output 35%; Electric Power Output 32%; Freight Car Loadings 22%; and Automobile Assemblies (Ward's Reports) 11%.

Output Hits Five-month High Despite Hot Weather

THE HEAT'S ON—both for weather and production.

Despite high temperatures throughout much of industrial America, STEEL's index for the last two weeks has held at 124, the highest point since the end of January.

Optimistic — Economists agree that output will slip during the July and August dog days, but the surprising thing is that the index has been as high as it is in this preview of late-summer weather. It was a respectable 122 for the week ended May 29, then skidded to the year's low of 115 in the June 5 week which included the Decoration-Day holiday.

Revised figures for the week ended June 12 zoomed it back up to 124. And preliminary figures show that it remained at the same level during the week ended June 19.

The Reason Why—High electric power output, improved steel production and good freight carloadings account for the index's high levels. Electric power output is the reason for much of the jump, climbing from one of the year's lows to the highest figure since mid-February. Latest reports of Edison Electric Institute place power generation at 8658 million kilowatt-hours for the week ended June 12.

Steel output has been climbing steadily since mid-May, and chances for its remaining at about the present level are good. The national rate rose a half point to 73.5 per cent of capacity in the week ended June 20. Production was estimated at 1,752,000 tons for the week by American Iron & Steel Institute.

Freight Good—Revenue freight car loadings also contributed to the upswing, hitting their highest level this year in the week ended June 12. The 697,583 cars loaded were 13 per cent more than in the previous holiday week.

Federal Reserve Board's industrial production index is also up. The preliminary seasonally adjust-

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	1,752	1,746	2,183
Electric Power Distributed (million kwhr)	8,580[1]	8,658	8,329
Bitum. Coal Output (daily av.—1000 tons)	1,260	1,075	1,539
Petroleum Production (daily av.—1000 bbl)	6,515[1]	6,495	6,470
Construction Volume (ENR—millions)	$317.9	$325.5	$249.7
Automobile, Truck Output (Ward's—units)	141,878	139,312	170,357
TRADE			
Freight Car Loadings (unit—1000 cars)	690[1]	698	813
Business Failures (Dun & Bradstreet, no.)	207	206	167
Currency in Circulation (millions)[3]	$29,803	$29,873	$29,970
Dept. Store Sales (changes from year ago)[3]	−1%	−18%	−4%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$19,440	$17,368	$19,451
Federal Gross Debt (billions)	$273.1	$273.3	$267.2
Bond Volume, NYSE (millions)	$16.3	$16.1	$13.5
Stocks Sales, NYSE (thousands of shares)	8,515	9,640	5,512
Loans and Investments (billions)[4]	$80.2	$80.5	$76.5
U. S. Gov't. Obligations Held (billions)[4]	$33.2	$33.2	$29.4
PRICES			
STEEL's Finished Steel Price Index[5]	189.75	189.75	189.18
STEEL's Nonferrous Metal Price Index[6]	214.1	215.0	210.8
All Commodities[7]	110.0	110.5	109.3
Commodities Other Than Farm & Foods[7]	114.4	114.4	113.5

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1954, 2,384,549. 1953, 2,254,459. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100.

"JETWELDING"

Lincoln powdered iron electrodes introduce new savings in arc welding

THROUGH the use of powdered iron in the electrode coating, Lincoln "Jetweld" utilizes the heat of the arc more efficiently than conventional electrodes. The iron powder is deposited in the weld, permitting higher welding speeds . . . 35% and more, without sacrifice in strength or quality.

"Jetweld" electrodes have smooth, automatic-like appearance. They are self-cleaning to simplify fabrication and cut costly man-hours.

A drag-type electrode, "Jetweld" provides easy operation in flat and near flat position work. "Jetweld 1" (E-6012) is designed for fillet welds. "Jetweld 2" (E-6020) is for deep groove butt welds.

Figure 1. Crucible Action. *End of "Jetweld" electrode forms a crucible . . . maintains right length of arc with simple drag technique.*

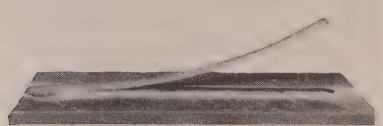
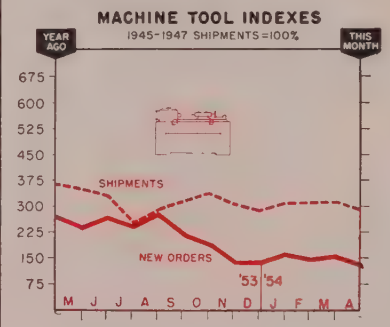


Figure 2. X-Ray Quality. *"Jetwelds" are self-cleaning. Appearance is smooth . . . resembles submerged-arc welds.*

GET FACTS. Speeds and procedures for "Jetwelding" are in Lincoln Bulletin 462, Mild Steel Weldirectory. Write to

THE LINCOLN ELECTRIC COMPANY
Dept. 1607, Cleveland 17, Ohio
THE WORLD'S LARGEST MANUFACTURER OF ARC WELDING EQUIPMENT



	New Orders		Shipments	
	1954	1953	1954	1953
Jan.	173.5	255.8	319.4	361.6
Feb.	159.8	282.1	323.1	354.5
Mar.	169.6	327.0	327.2	375.9
Apr.	142.6	276.8	302.6	372.7
May	....	246.4	....	356.0
June	....	273.4	....	342.2
July	....	247.3	....	267.6
Aug.	....	286.9	....	299.6
Sept.	....	223.7	....	328.3
Oct.	....	198.7	....	348.4
Nov.	....	146.6	....	320.2
Dec.	....	149.8	....	301.4

National Machine Tool Builders' Assn.

Charts copyright 1954 STEEL.

	Sales Billed—Units		
	1954	1953	1952
Jan.	249,956	277,309	213,998
Feb.	295,171	326,604	255,864
Mar.	307,862	345,989	248,431
Apr.	258,712	288,474	217,211
May	.....	286,515	213,668
June	.....	304,086	274,457
July	.....	228,268	207,593
Aug.	.....	291,260	254,537
Sept.	.....	340,532	283,732
Oct.	.....	310,867	327,814
Nov.	.....	238,153	293,079
Dec.	.....	191,570	310,661
Totals	.....	3,429,627	3,101,045

American Home Laundry Mfrs. Assn.

ed figure for May is 125, compared with March and April's 123. This is the first month the index has shown an increase since last July.

A Recovery . . .

Materials handling equipment makers are recovering from a decline begun last October. Shipments still are below the all-quarter average for 1951-1953 but definitely above the low point reached last December.

Materials Handling Institute reports its index of shipments for first-quarter, 1954, was a low 173 compared with the so-so fourth-quarter, 1953, mark of 223 (January, 1948-June, 1950=100). But for March, the latest figure reported, the index was back up to about 190.

Used Car Sales Hold Up . . .

A used-car sales record could be set for the January-June period. And with new car sales currently lagging last year's by 8 per cent, the slight 1-per-cent edge over last year's level chalked up by the used-car dealers looks especially impressive, according to *Ward's Automotive Reports.*

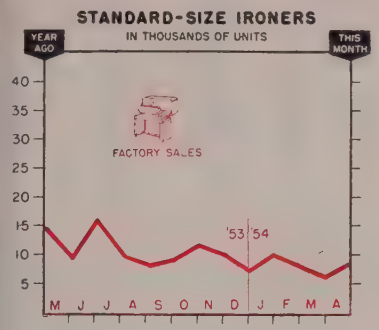
Booming sales have cut dealers' inventories to a 24-day supply as of May 31, a considerable drop from the 35-day supply on hand January 31. Even this is a high stock level—only 7 per cent below the Nov. 30, 1953, record—but still healthy in terms of days' supply, states the automotive journal.

The level of used-car stocks depends a lot on the push given new car sales, and that impetus shows only little indication of easing. *Ward's* comments, "There is much opinion that the extent of inventories the remainder of 1954 will be geared to their movement off the lots, with profit margins remaining secondary."

Building Boom Goes On . . .

Construction is still wending its merry way upward. Contract awards in May in the 37 eastern states set "phenomenal" new records, says Thomas S. Holden, vice chairman of F. W. Dodge Corp. "The May total ($1,925,253,000) was the highest monthly total in Dodge's 63-year history," he stated.

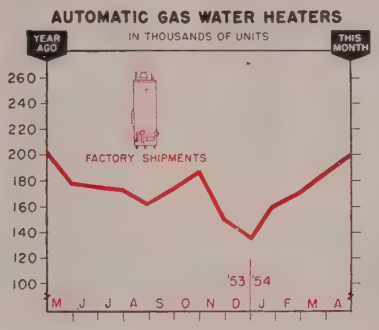
Nonresidential construction in May was $672 million, up 11 per cent from April and 16 per cent



Factory Sales—Units

	1954	1953	1952
Jan.	9,792	24,395	15,636
Feb.	8,208	22,586	17,630
Mar.	6,025	16,066	13,913
Apr.	8,388	14,080	8,938
May	....	9,323	12,652
June	....	12,529	17,654
July	....	9,626	15,025
Aug.	....	8,067	16,477
Sept.	....	9,113	22,492
Oct.	....	11,666	25,204
Nov.	....	10,105	19,724
Dec.	....	6,908	16,798
Total	....	154,464	202,143

American Home Laundry Mfrs. Assn.



Shipments—Units

	1954	1953	1952
Jan.	164,400	184,000	148,700
Feb.	175,000	188,500	145,800
Mar.	187,800	203,000	153,300
Apr.	203,100	204,400	153,300
May	....	179,000	155,300
June	....	175,800	159,000
July	....	173,800	131,300
Aug.	....	163,000	161,500
Sept.	....	175,300	171,200
Oct.	....	189,200	185,300
Nov.	....	151,900	167,100
Dec.	....	137,800	178,600
Total	....	2,125,700	1,910,400

Gas Appliance Mfrs. Assn.

above May, 1953. Residential construction rose to $825 million, 4 per cent above April and a whopping 29 per cent over May, 1953.

Totals for June probably will be lower. But the $317 million in awards reported by *Engineering News Record* for the week ended June 17 indicates that the construction industry is holding on to its boom.

Trucking Totals Slip . . .

Intercity trucking in first quarter, 1954, was off 4.4 per cent from a year ago, American Trucking Associations Inc. announces. But in spite of the dip the period is still the second-largest first quarter on record.

The drop wasn't general either. Only four regions showed decreases; business in the other five went up. Biggest gain was 8.8 per cent in the Rocky Mountain region. Central region showed the largest drop, 11.8 per cent.

From FRB: A Stimulant . . .

Federal Reserve Board reduction of reserve requirements of the 6700 member banks is expected to prove as much a business stimulant as the cut of June, 1953.

The reduction is to be applied in several steps between now and Aug. 1 releasing more than $1.5 billion from reserve. That will increase the banks' lending ability by about $9 billion.

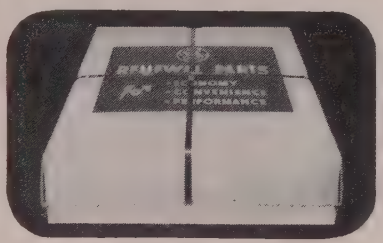
Some reasons for the cut: To take care of heavier private financing requirements, including marketing of crops and replenishment of retail stocks in advance of the fall and Christmas sales peak; and to facilitate Treasury borrowing of $8 billion to $10 billion between July 1 and Dec. 31.

It was feared that competition between private and treasury borrowing would have resulted in a credit sweep. Instead, lower interest rates, generally, are foreseen.

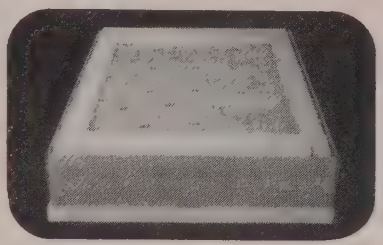
Trends Fore and Aft . . .

Air-conditioner sales are going up with the temperature. Admiral Corp.'s distributor-to-dealer sales jumped 38 per cent in the week ended June 11, says W. C. Johnson, vice president-sales . . . Retail sales are holding up well though slightly under year-ago levels. Relaxed credit terms and reduced prices are being used by many merchants to boost shopping, reports Dun & Bradstreet Inc.

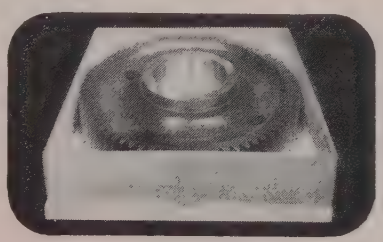
HOW MARVELLUM vpi® WRAP Speeds Assembly of Diesel-Electric Locomotives



Part arrives at assembly plant in steel-strapped skidded carton ready for stand-by storage.



Removal of carton top reveals rust-preventive VPI cover sheet held in place by top blocking.



Gear, on bottom sheet of VPI paper, is clean, bright and ready for immediate installation. No messy, time-consuming degreasing delays the assembly of General Electric diesel-electric locomotives.

In shipment and storage, Marvellum VPI Wrap positively protects parts against rust. A special coating on the paper vaporizes and forms an invisible protective film around the item packed, preventing corrosion. Wherever prevention of rust is a factor, you can save time and money with VPI. To get all the facts about this revolutionary protective wrap, write for our fully descriptive booklet and generous VPI sample. Our technicians will be glad to discuss corrosion problems peculiar to your plant.

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THE OHIO STEEL FOUNDRY CO.

LIMA, OHIO • PLANTS AT LIMA AND SPRINGFIELD, OHIO

W. E. WATSON
. . . manages Fairbanks, Morse works

JACOB J. JAEGER
. . . appointed to new post at Pratt & Whitney

J. C. CALHOUN JR.
. . . heads Gas Machinery Co.

Fairbanks, Morse & Co., Chicago, appointed **W. E. Watson** manager of their Beloit, Wis., Works. **R. H. Morse III** was made assistant to the vice president in charge of sales with headquarters in Chicago. Mr. Watson for the last year and a half has been works manager of the company's affiliate, Canadian Locomotive Co. Ltd., Kingston, Ont.

Mills Industries Inc., Chicago, appointed **John H. Zauner** chief engineer. He formerly was chief engineer of all ordnance development and production programs at Eureka Williams Co., division of Henney Motor Co.

Ernest E. George, manager of design and application engineering, **Carboloy Department,** General Electric Co., Detroit, was named manager of magnetic products engineering.

Ben C. Wells was made superintendent of **Republic Steel Corp.'s** blooming mill at Canton, O. He succeeds **Joseph P. Charlton,** resigned because of ill health. **Herman O. Kaiser** was named assistant superintendent to succeed Mr. Wells.

Loren B. Clay was made manager of tubular products and cold-finished bar sales for the Seattle steel service plant of **Joseph T. Ryerson & Son Inc.**

Jacob J. Jaeger fills the newly created post of chief engineer, machinery engineering department, at the **Pratt & Whitney Division** of **Niles-Bement-Pond Co.** at West Hartford, Conn. He joined the division in 1940 and was made assistant manager of machinery engineering in 1951.

James W. Tweedy was elected president and a director of **Redmond Co. Inc.,** Owosso, Mich., and **Charles W. Frost** was made chairman of the board. These positions were vacant as a result of the recent death of **Frank C. Campbell.** Mr. Tweedy previously held the positions of vice president in charge of sales and executive vice president and general manager.

Baldwin - Lima - Hamilton Corp., Philadelphia, appointed **Don V. Slaker** chief engineer, dump car department. For the last 28 years he has been with Austin-Western Co. serving in various capacities in the production and engineering departments.

Dr. H. Blumenthal heads a newly created service department of **American Electro Metal Corp.,** Yonkers, N. Y., which will undertake chemical analyses, in particular oxygen and nitrogen determinations in cermets, steel and other metals, for industrial and research organizations.

J. C. Calhoun Jr. was elected president of **Gas Machinery Co.,** Cleveland. **Robert Kyle** and **K. W. Stookey** were elected first and second vice presidents, respectively. Mr. Calhoun has been serving as vice president and secretary. Mr. Kyle was sales manager and Mr. Stookey vice president.

Robert W. Peterman, formerly responsible for product design and sales engineering, was made sales manager of **Nopak Division,** Galland-Henning Mfg. Co., Milwaukee. **Robert J. Garnik** was made chief engineer.

James Diamond was named manager of **General Motors Corp.'s** jet engine plant at Willow Springs, Ill., Buick Motor Division. He succeeds **Guy D. Briggs Jr.,** appointed assistant controller of the corporation's Electro-Motive Division at La Grange, Ill. Mr. Diamond was manufacturing superintendent of the Willow Springs plant.

Joseph F. Capoun, assistant general manager, was elected a vice president of **Columbia Burner Co.,** Toledo, O.

Rod Davies and **Stuart Maise** were appointed sales representatives for **Wolverine Tube Division,** Calumet & Hecla Inc. Mr. Davies, former plant engineer for Reynolds Metals Co., is now located in Detroit at the general sales of-

GIFFORD V. LEECE

BENJAMIN C. ESSIG

. . . president and executive v. p. at Gardner-Denver Co.

fice. Mr. Maise was assigned the east-central district and has headquarters at 1732 Guardian Bldg., Detroit.

Gifford V. Leece, vice president-sales, was elected president of **Gardner-Denver Co.,** Quincy, Ill., to succeed the late **E. F. Schaefer. Benjamin C. Essig,** vice president and general manager of the firm's Denver plant, was promoted to executive vice president.

Fenmore E. Dunn was made general manager of **Worthington Corp.'s** reorganized vertical turbine pump division. He will have headquarters at Worthington's Succasunna, N. J., Works, to which manufacture of this product is being transferred from Harrison, N. J. His responsibilities include product and application engineering, as well as manufacture and sale of vertical turbine pumps produced at Succasunna and the Denver plant.

W. H. Evans was appointed a vice president of **Diamond Alkali Co.,** Cleveland. **John W. Mantz** was made general manager of the newly created silicate, detergent, calcium division; **L. T. Welshans** general manager of the newly created cement and coke division; and **C. R. Brown** was made assistant works manager to succeed Mr. Mantz at the Painesville, O., plant.

Samuel J. Lombardo joined **E. W. Bliss Co.** as sales engineer at Philadelphia. He formerly served Quaker Rubber Division, H. K. Porter Co., and Brown Instrument Division, Minneapolis-Honeywell Regulator Co.

Arthur K. Watson was elected president, **IBM World Trade Corp.,** New York, a subsidiary of International Business Machines Corp. Formerly vice president and general manager, he succeeds **Harrison K. Chauncey,** elected vice chairman of the board.

A. M. Byers Co., Pittsburgh, appointed **Albert R. Frame** general manager of operations and **Paul H. Wilson** general superintendent of its Ambridge, Pa., plant. Mr. Frame, who joined Byers in 1948, has served successively as assistant to the general superintendent of the Ambridge plant, as superintendent of the rolling mill and as assistant general superintendent. Mr. Wilson, former rolling mill superintendent, succeeds **H. B. Linderman,** retired. Other appointments include **Daniel A. Schmitt** as superintendent of rolling mills and assistant to Mr. Wilson, and **John F. Luzadre** as assistant superintendent, rolling mills.

Frank R. Grote Jr. was made superintendent of **American Can Co.'s** new Denver plant. He was assistant to the superintendent of manufacture at the central division office, Chicago.

William C. Prettyman was added to the sales application engineering staff of **Reliance Electric & Engineering Co.** in New York.

A. E. Knazek is district sales and service manager in Cleveland, Akron, Canton, O., and Erie, Pa., for **Threadwell Tap & Die Co.**

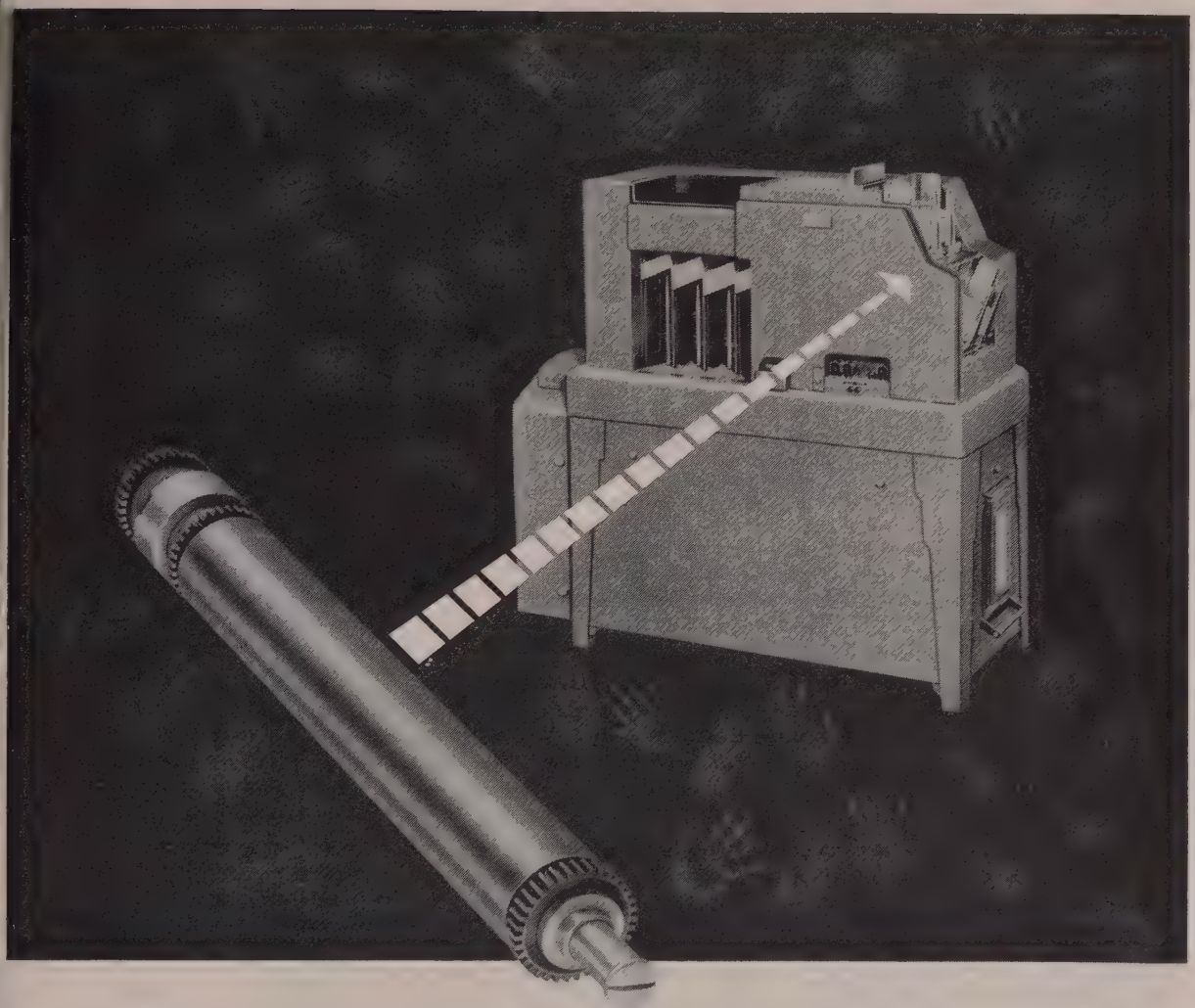
William N. Hulme was made district sales manager of brake shoes and **John L. Goheen** district sales manager of castings for **Brake Shoe & Castings Division,** American Brake Shoe Co. Both men will be located at San Francisco. **John F. Ducey,** vice president, BS&C division, is transferred from San Francisco to New York headquarters.

Dayton Rogers Mfg. Co., Minne-

ALBERT R. FRAME

PAUL H. WILSON

. . . A. M. Byers Co. appointments



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This is IBM's Collator—a mechanical super-accountant that shuffles, selects, matches and merges punched cards at the rate of four per second!

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We have years of experience, the modern test and development facilities, and more than 55 analyses in many metals to unravel your problem. Write for a copy of our new Technical Bulletin #7-2 on Seamless and WELDRAWN* Beryllium Copper Tubing. Superior Tube Company, 2005 Germantown Ave., Norristown, Pa.

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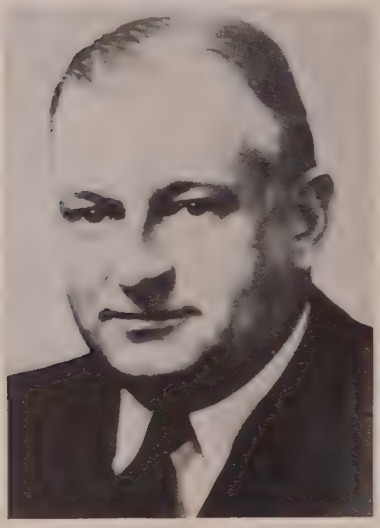
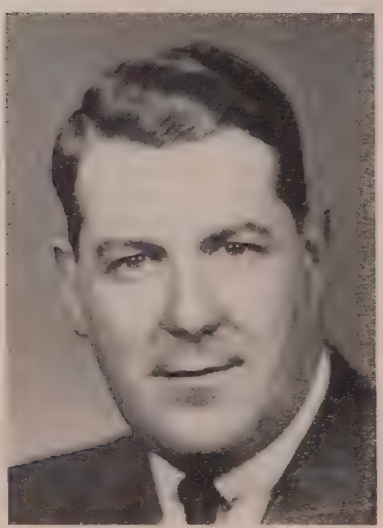
EDWARD H. WEITZEN
. . . joins AMF as marketing v. p.



BERTON E. ROGERS
. . . Vickers' gen. factory mgr.



AMBROSE J. WARDLE JR.
. . . McKay Machine Co. v. p.-sales

apolis, appointed **Oscar Hood** as sales engineer for Texas and Oklahoma. He has headquarters in Ft. Worth, Tex.

Edward H. Weitzen, former vice president, Bulova Watch Co. Inc. and president and director of Bulova Research & Development Laboratories Inc., joined **American Machine & Foundry Co.,** New York, as vice president in charge of marketing, a new executive post with the company.

Marshall Post retired as vice president in charge of operations for **Birdsboro Steel Foundry & Machine Co.,** Birdsboro, Pa., after more than a half century of service to the steel foundry industry.

Neil S. Edmonstone, a director and secretary-treasurer, was also named vice president of **Steep Rock Iron Mines Ltd.,** Atikokan, Ont.

Charles V. Nicholson joined **F. J. Stokes Machine Co.,** Philadelphia, as export product manager. He has been export division manager at Henry Disston & Sons Inc.

McCulloch Motors Corp., Los Angeles, named **Charles D. Allis** assistant sales manager.

Berton E. Rogers, former vice president-manufacturing for Motor Products Corp., joined **Vickers Inc.** as general factory manager. He will be in charge of Vickers' plants in Detroit, Omaha, Nebr., and Joplin, Mo.

Whirlpool Corp., St. Joseph, Mich., elected **Frederick S. Upton** to the new post of senior vice president. He formerly served as vice president and treasurer. **Mason Smith** was elected finance vice president, and **E. C. Cudmore** to the new post of controller. The changes are effective Sept. 1.

B. W. Clawson was placed in charge of **Douglas Aircraft Co. Inc.'s** new plant in Tucson, Ariz.

J. Ralph Patterson, vice president of sales at Mackintosh-Hemphill Co., was elected a director of **Kidd Drawn Steel Co.,** Aliquippa, Pa.

McKay Machine Co., Youngstown, named **Ambrose J. Wardle Jr.** vice president in charge of sales and **Carl J. Honen** vice president in charge of advertising and sales promotion. Both were assistants to the president. **R. J. Miller,** vice chairman and vice president, was made vice chairman and first vice president.

Anthony J. Ruscito was appointed to the field engineering staff of **Sprague Electric Co.,** North Adams, Mass. He was sales manager for United Mineral & Chemicals Corp.

Harold Christopher and **Adolph A. Hirstius** were appointed to positions of manager and assistant manager of the manufacturers' products department at **American Steel & Wire Division,** U. S. Steel Corp., with headquarters at New York.

George W. Searles was named engineering sales representative in the Los Angeles office of **Columbia-Geneva Steel Division,** U. S. Steel Corp.

Grant A. Jackson succeeds **Patrick A. Kennon** as manager of the Oklahoma district of U. S. Steel Corp.'s **Oil Well Supply Division.** Mr. Kennon is now located at New York, serving as assistant manager of the export area.

W. E. Groenstein, assistant purchasing agent, was promoted to purchasing agent at **H P L Mfg. Co.,** Cleveland.

Warren H. Brand was named director of engineering and research, **Conoflow Corp.,** Philadelphia.

John W. Schneider was appointed manager, Dearborn Iron Foundry, **Ford Motor Co.,** Dearborn, Mich., and **Harold C. Grant** was made manager of the Dearborn Specialty Foundry. Formerly production manager of the specialty foundry, Mr. Grant succeeds Mr. Schneider.

John A. Wilson, formerly with the Atomic Energy Commission, joined **Hiller Helicopters,** Palo Alto, Calif., as corporate planner.

Hugh V. McGuire heads **Hanson-Van Winkle-Munning Co.'s** expanded equipment engineering and installation sales activities, now handled out of Matawan, N. J.

Semi-Conductor Division, **Radio Receptor Co. Inc.,** New York, appointed **Jerome R. Meltzer** assist-

WICKWIRE WIRE

puts the ease in your easy chair

To be truly comfortable the upholstery in a chair or couch must have the right kind of springs formed from the right kind of wire.

Wickwire Gamma Spring Wire—specially processed for upholstery use—has won outstanding preference in this service because manufacturers have found they can always depend upon it for long-lasting retention of resiliency and shape.

Here's just one more example of the wide diversity of application embraced within the complete range of Wickwire Wire. Let us know your requirements in any specialty steel wire. We are prepared to meet your most exacting specifications for wire of high or low carbon steel—round or shaped—in all tempers, finishes and grades.

for the wire you require—check first with Wickwire

THE COLORADO FUEL AND IRON CORPORATION—Denver and Oakland

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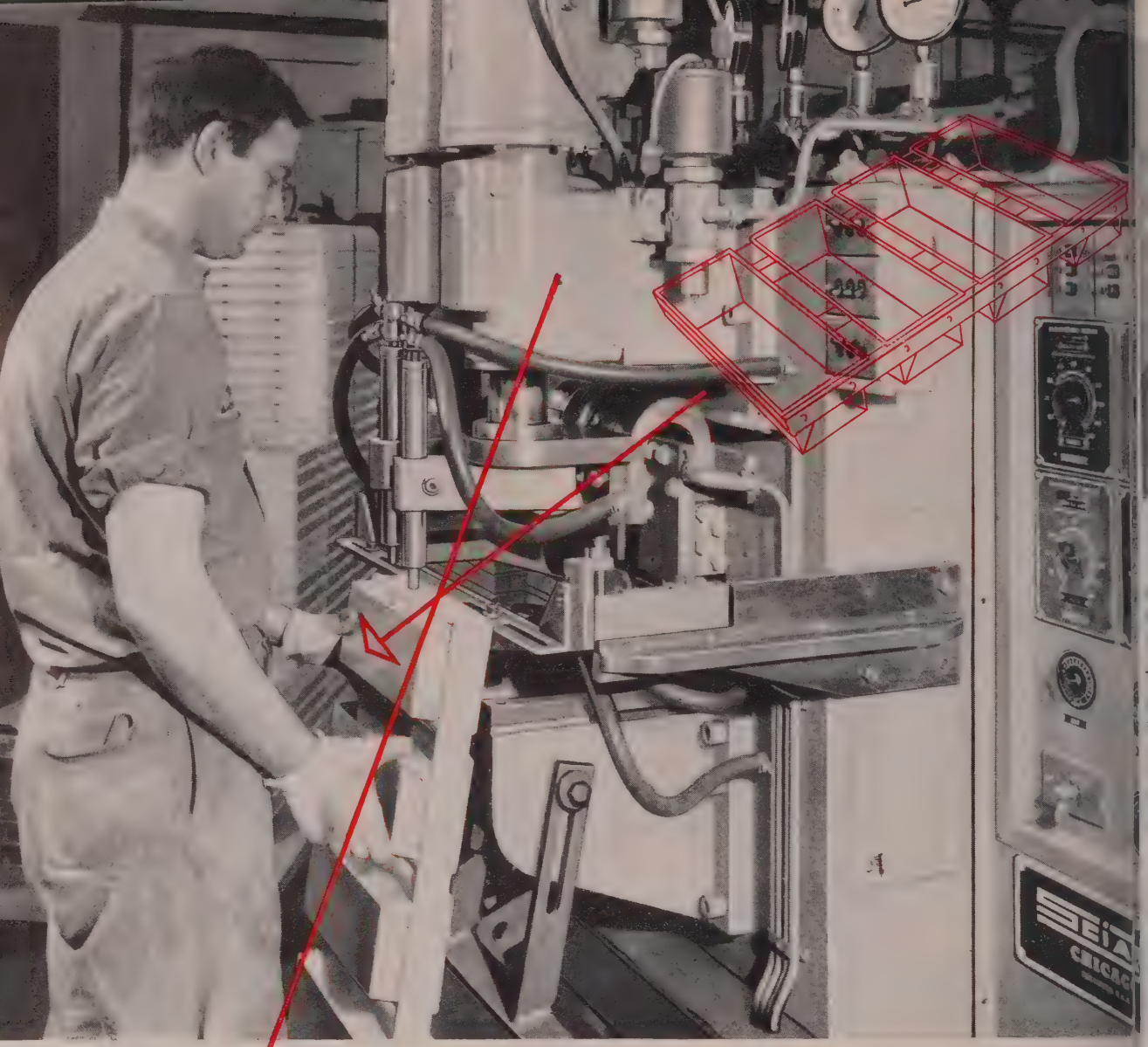
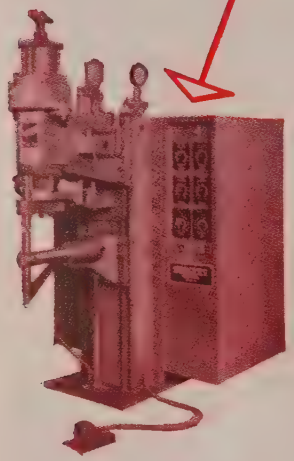
2055

WICKWIRE WIRE

CF&I PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL AND IRON CORPORATION





Sciaky Three-Phase Spot Welding Cuts Cost of Stronger, More Sanitary, Aluminum Bread Pans

The Lockwood Mfg. Co., Cincinnati, Ohio, leader in the development of aluminum bread pans for the commercial baking industry, uses Sciaky patented Three-Phase spot welding to maintain the quality their reputation demands.

The Three-Phase principle of operation, pioneered and invented by Sciaky, offers many distinct advantages over conventional single phase—such direct savings as lower installation costs, lower power costs, no expensive current compensators, greater welding consistency, and longer electrode life.

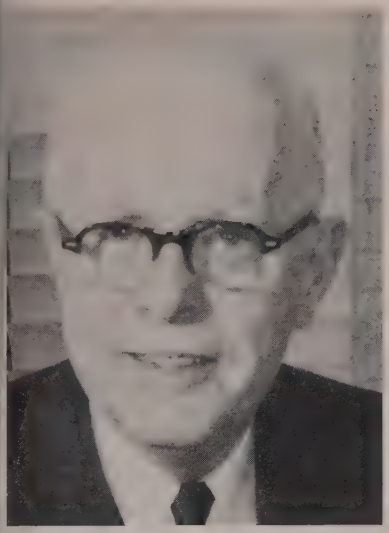
Sciaky Three-Phase is acceptable to many, many installations where single phase is not. Write for the complete Three-Phase story in Bulletin 137.

Lockwood's use of Sciaky Three-Phase welders is completely described in "Resistance Welding at Work," Vol. 3 — No. 10. Another fine example of Sciaky basic thinking — welders designed to do *more useful work* at *lower operating cost* with *maximum reliability.*

Largest Manufacturers of Electric Resistance Welding Machines in the World

SCIAKY

Sciaky Bros., Inc., 4909 West 67th Street, Chicago 38, Illinois



THOMAS J. McLOUGHLIN
. . . joins Blocked Iron Corp. as v. p.

GRAHAM B. BROWN
. . . works mgr. at Tube Reducing

STANLEY C. AMREN
. . . Cleveland Welding v. p., gen. mgr.

ant sales manager in charge of its newly organized distributor sales department.

Thomas J. McLoughlin, formerly assistant to the vice president of steel operations, U. S. Steel Corp., is now associated with **Blocked Iron Corp.,** Albany, N. Y., in the capacity of vice president.

William B. Peters was elected secretary-treasurer of **J. I. Case Co.,** Racine, Wis., to succeed the late **William E. Anderson,** former treasurer.

Trane Co. appointed **S. Thomas Shimanski** to a new branch sales office located at 402 Palamino Lane, Madison, Wis.

Producto Corp., appointed **T. J. Rancont** district sales manager, Detroit branch.

Graham B. Brown was appointed works manager of **Tube Reducing Corp.,** Wallington, N. J. Before joining Tube Reducing in 1951, he was employed from 1948-1951 as iron and steel adviser to the Munitions Board and chief of the Office of the Material Requirements Board, Office of the Secretary of Defense. He previously served Youngstown Sheet & Tube Co. as superintendent of its seamless tube hot mill department.

J. E. Callahan, until recently acting manager, Micarta Division, Westinghouse Electric Corp., joined **Garrett Corp.,** Los Angeles, as staff assistant to the vice president in operation of its newly acquired eastern companies, Aero Engineering, Air Cruisers and Aero Sales Engineering. Mr. Callahan has headquarters in New York.

Stanley C. Amren, since 1950 manager of the Little Rock, Ark., plant of U. S. Time Corp., joined **Cleveland Welding Co.,** Cleveland, subsidiary of American Machine & Foundry Co., as vice president and general manager. **David S. Meiklejohn** is treasurer, supplementing his duties as a director and treasurer of the parent company. Both appointments result from the recent retirement of **A. F. Mellman** as Cleveland Welding's executive vice president and treasurer.

Donald M. Laflin, vice president-sales, Giddings & Lewis Machine Tool Co., Fond du Lac, Wis., was elected a vice president of **Amertool Services Inc.,** which is operated by machine tool companies to supply application services to manufacturers in Japan, Mexico, South America and Germany.

OBITUARIES . . .

Walter H. Peters, 58, assistant vice president, **Wisconsin Bridge & Iron Co.,** Milwaukee, died June 13.

Harry M. Baron, 75, owner of **Baron Iron & Metal Co.,** Bowling Green, O., died June 11.

Jack M. Zapoleon, 58, vice president, **Borg-Erickson Corp.,** Chicago, died June 10.

George T. Christopher, 66, a retired president and general manager, **Packard Motor Car Co.,** died June 7 at his home in Troy, O. He retired in 1949.

John H. Crider, 68, a buyer for **A. O. Smith Corp.,** Milwaukee, until retirement five weeks ago, died June 11.

Nathaniel R. Richardson, 56, vice president and works manager, **Electric Controller & Mfg. Co.,** Cleveland, died June 14.

Henry W. Maskrey, 55, general manager of **Jones & Laughlin Steel Corp.'s** electricweld tube division at Oil City, Pa., died June 12.

William J. Duthie, 75, founder and president, **Standard Steel Fabricating Co. Inc.,** died June 8 at his home in Seattle.

Alfred H. Zastrow, 54, traffic manager, **A. O. Smith Corp.,** Milwaukee, died June 8.

Joseph Miller, president of **Columbia Iron & Metal Co., Universal Steel Co.** and **J. Miller Co.,** Cleveland, died June 8.

Tom Makemson, secretary, Institute of British Foundrymen, England, died June 10.

West Coast Mill Opens

Pacific Steel Rolling Mills producing small steel merchant bars and shapes

DESIGNED to produce small steel merchant bars and small shapes exclusively, Pacific Steel Rolling Mills Inc., Seattle, commenced rolling operations early this month.

Facilities include a continuous steel rolling mill consisting of six roll stands, 2-high, oil heating furnaces and automatic cooling bed. The cooling bed is unique in that it requires no manual attendance, the bars being delivered from the cooling bed to the shearman mechanically. In addition to straightening machinery, the company maintains its own roll lathe shop. The mill furnace delivers in excess of 2 million Btu's per hour.

Specialty Mill—The firm's principals feel that Pacific Steel Rolling Mills Inc. has an auspicious start as the West's newest specialty steel rolling mill, because of the high efficiency of the company's heating and rolling facilities, proved in preliminary rolling trials.

The mill's June-July rolling schedule consists of ⅜-in. and ½-in. round reinforcing bars, angles and strip. Angle sizes will range from ⅛ x ½ x ½-in. to ⅛ x 1 x 1 in.; channels, ¾-in. and 1 in.; bands, flats, ⅛ x ⅜-in. to ⅛ x 1 in., 3/16 x ½-in. to 3/16 x 1 in., and ¼ x ½-in. to ¼ x 1 in. By the end of summer, the mill will produce all small shapes, as well as special small shapes to customers' specifications.

Pacific Steel Rolling Mills Inc. specializes in the hard-to-find light tonnage items which the large-tonnage mills are reluctant to roll. The firm has a flexible sales policy, a feature of which is "less-than-carload-lot" shipments — a minimum mill order of only 10,000 lb as against the usual 40,000-lb minimum required by large-tonnage steel mills.

Capacity of the present equipment is 400 tons per month.

Future expansion plans include an 8-in., 6-stand continuous mill; a 2-high breakdown mill; and a small electric melt furnace.

White Motor Opens Branch

White Motor Co., Cleveland, is establishing a direct factory branch at Akron with Robert G. Oakley branch manager. The sales and service operations were formerly handled in Akron by Cashner White Truck Co.

Los Angeles Foundry Expands

Economy Pattern & Foundry Co., Los Angeles, producer of aluminum castings, is enlarging its foundry in that city.

Arnot Jamestown Expands

Aetna Steel Products Corp.'s Arnot Jamestown Division, producer of hollow metal products, more than doubled its manufacturing space with the construction of additional plant facilities on property adjoining its existing factory in Jamestown, N. Y.

Air Filter Buys Plant

American Air Filter Co. Inc., Louisville, purchased Ice Cooling Appliance Corp., Morrison, Ill., a subsidiary of City Products Corp., Chicago. The newly acquired firm, maker of ice refrigerators, freezers, soft drink coolers and vending machine parts, will be operated by AAF's Herman Nelson Division, Moline, Ill., which produces heating and ventilating equipment.

Carmet Completes Project

Allegheny Ludlum Steel Corp., Pittsburgh, completed an expansion and improvement program at its Carmet Division plant in Ferndale, Mich. The new facilities make the company an integrated prime producer of cemented carbides for tool and die applications. Floor space of the plant was increased by 100 per cent and the company now is manufacturing all its carbide powder in its own plant. In addition to construction of the powder plant, total capacity of the division has been increased by 50 per cent.

Steelcraft Mfg. Status Holds

Steelcraft Mfg. Co., 9017 Blue Ash Rd., Rossmoyne, O., in the Greater Cincinnati area, is not associated in any way with Fulton Steelcraft Co., Swanton, O., which was purchased recently by I. A. and J. F. Higgins. Steelcraft Mfg. Co. produces standardized metal

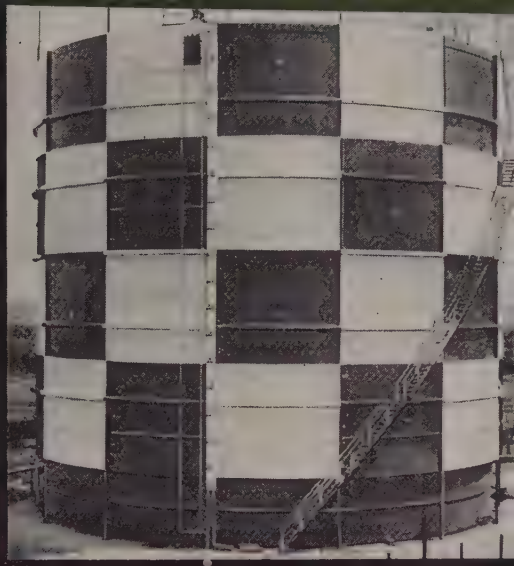
Jet Stratotanker Dwarfs Stratofreighter

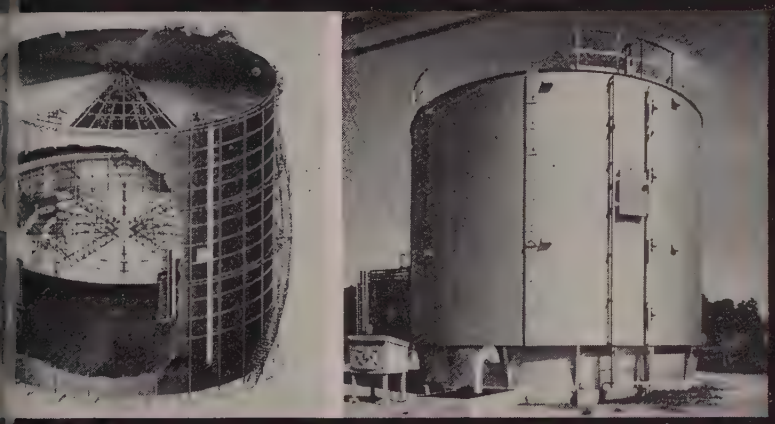
Typifying the Jet Age, the new Boeing prototype Stratotanker—America's first jet transport—is shown above (foreground) parked alongside the present Air Force's tanker-transport, the Boeing Stratofreighter. The Stratotanker is designed for efficient aerial refueling of jet bombers, fighters and reconnaissance planes and will carry from 80 to 130 passengers in its airline version

simple! proved in use!

Wiggins Gasholder

BY GENERAL AMERICAN



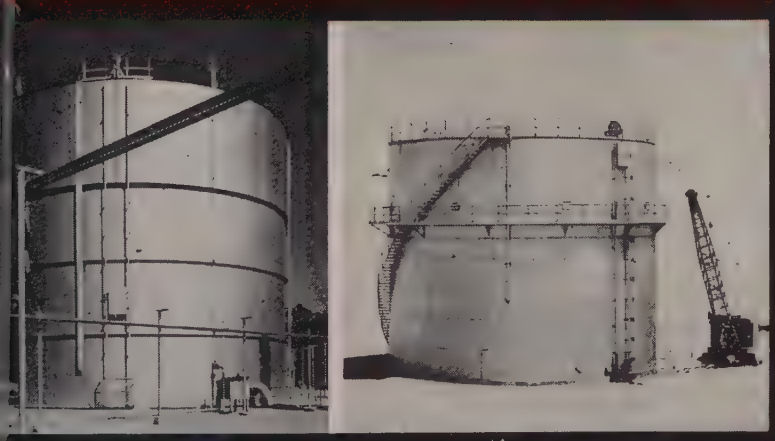


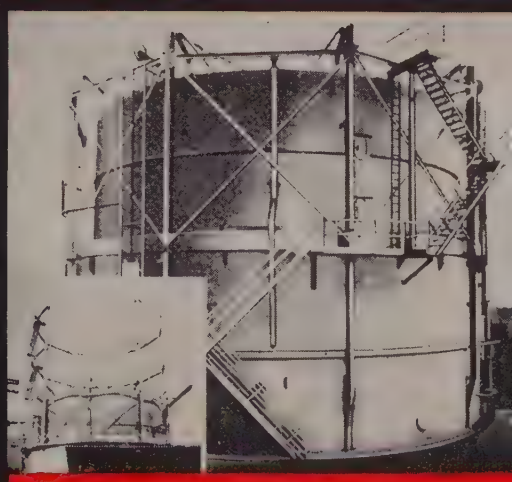
The only gasholder that uses

NO WATER
NO TAR
NO GREASE

The only gasholder that assures you

NO WEATHER WORRIES
NO OPERATING COSTS
NO MAINTENANCE PROBLEMS





You can convert your old style gasholders to get the Wiggins advantages

Be sure to get the performance record on the only modern gasholder before you plan any gasholder construction.

GENERAL AMERICAN

WIGGINS VAPOR SEALS GENERAL AMERICAN TRADE MARK

TRANSPORTATION CORPORATION

General Sales Office: 135 South La Salle Street
Chicago 90, Illinois

Offices in principal cities

Alcoa Opens Lancaster, Pa., Fabricating Works

Aluminum Co. of America, Pittsburgh, opened its Lancaster, Pa., Works. This plant is devoted almost solely to the production of aluminum parts on cold-heading and screw machines. It also produces a small quantity of special machined magnesium parts. Facilities permit a wide range of secondary machining, finishing and heat-treating operations. Equipment of the rivet shop, shown above, includes various types of heading machines for manufacture of rivets, nails and metal blanks from which many kinds of aluminum screws are produced

buildings and sections for commecial farm and industrial use; industrial and commercial steel casement windows; basement and utility windows; window and door trim; steel door frames; steel sliding closet doors; and similar products.

GE To Build $5-Million Plant

General Electric Co., Schenectady, N. Y., will begin construction this year of a $5-million plant at Shelbyville, Ind., to manufacture industrial furnaces, induction heating equipment and heating devices.

Kaiser Expands on Coast

Major additions to Kaiser Aluminum & Chemical Corp.'s Trentwood Works, Spokane district, will be two rolling mills, a 3000 fpm cold-rolling mill especially designed to produce light-gage sheet and a mill to produce wide embossed, or patterned, sheet. This is part of the firm's $1.5-million expansion of its aluminum sheet rolling and finishing facilities which boosts to a total of $25 million investments by Kaiser in new equipment and enlarged capacity for its Northwest operations.

Forms Eastern Foil Corp.

Eastern Foil Corp. was organized by E. H. Klingelfuss to serve the foil laminating field. The company will be located, as soon as its plant is completed and equipped, on Route 23, Pompton Plains, N. J. Mr. Klingelfuss is president; Fred Brombacher, vice president; John Siebenmann, secretary-treasurer.

B&W Division Opens Branch

Babcock & Wilcox Co.'s Tubular Products Division, Beaver Falls, Pa., opened a district sales office at 2330 Victory Parkway, Cincinnati. H. W. Doctor is the district sales manager.

Canadian Foundry Expands

Canadian Car & Foundry Co. Ltd., Montreal, Que., marked official completion of a $4-million modernization program at its Longue Pointe steel foundry. Principal phase of the program was installation of a sand-handling and reclamation system which can utilize 75 per cent of previously discarded sand.

Waunakee Gets Casting Rights

Waunakee Alloy Casting Corp., which recently opened its foundry in Waunakee, Wis., has been licensed by Youngstown Alloy Casting Corp., Youngstown, to produce Trantinyl special alloy steel castings.

Webb Adds Products

Webb Corp., Webb City, Mo., has been licensed to manufacture the line of welding fixtures and metal forming equipment formerly built by Reed Engineering Co., Carthage, Mo.

Cleveland Firm Changes Hands

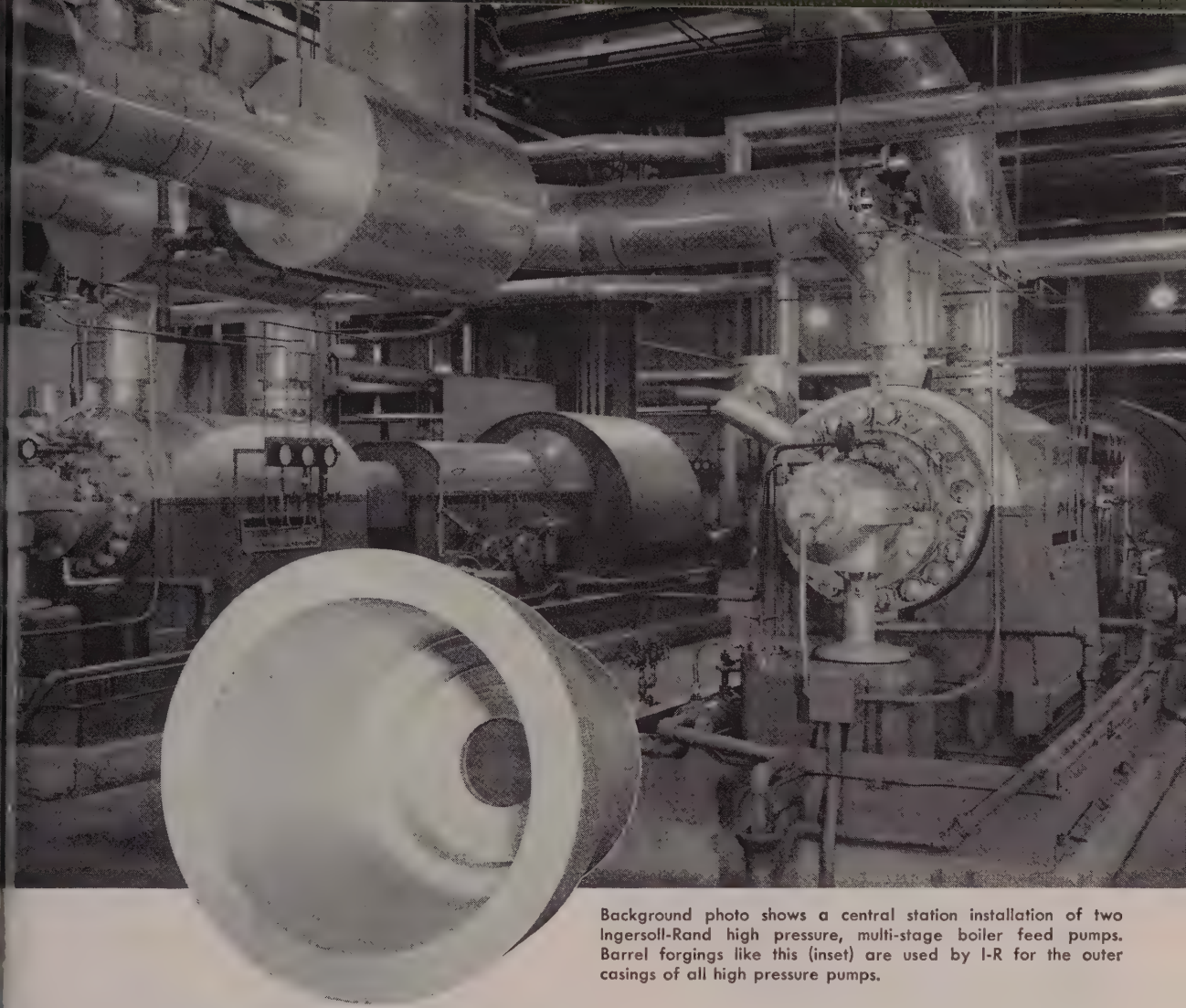
American Brake Shoe Co., New York, purchased Metallic Friction Materials Co., Cleveland, and will operate it as part of its Sintermet Division. The firm makes powdered metal friction materials which will supplement and expand the present powdered metal products of the Brake Shoe firm. W. T. Kelly Jr., vice president of Brake Shoe, is president of the division and B. G. Drummond, manager of Sintermet Division, is executive vice president of the division. F. J. Lowey, president, and E. P. Cawley, vice president of Metallic Friction Materials Co., become vice presidents of the division.

Texas Plant in Full Operation

Chicago Pneumatic Tool Co., New York, is now in full production on a complete line of oil well drilling equipment at its recently completed $4.5-million plant in Ft. Worth, Tex. The plant contains 130,500 sq ft of floor space.

Wellman Buys Crane Business

Wellman Engineering Co., Cleveland, purchased the Locomotive Crane Division and plant of Browning Crane & Shovel Co., that city. Other Wellman products include Hulett-type ore unloaders, coal and ore bridges, unloading towers,



Background photo shows a central station installation of two Ingersoll-Rand high pressure, multi-stage boiler feed pumps. Barrel forgings like this (inset) are used by I-R for the outer casings of all high pressure pumps.

Ingersoll-Rand tells how:

STEEL FORGINGS HELP GIVE LONG LIFE TO HIGH PRESSURE BOILER FEED PUMPS

Ingersoll-Rand Class CHTA boiler feed pumps are widely used in high pressure central power generating stations throughout the world. They are double-case units, the inner assembly containing the rotor and fluid passages and the outer casing providing the pressure vessel to enclose this pumping unit.

For service under high pressures and temperatures, Ingersoll-Rand uses steel forgings for the outer casing of these boiler feed pumps. Since Standard Steel forges these outer barrels from solid billets of high carbon steel, they have a close grained, homogeneous structure. That's a big reason why Ingersoll-Rand double-case pumps have established a reputation for long, trouble-free service with sustained high efficiency.

Very likely, you can improve *your* products by using Standard Steel barrel forgings, rolled rings, flanges or other forgings. Our engineering and metallurgical departments have helped solve many diverse problems. Please write us about yours.

Standard Steel Works Division

Burnham (Mifflin County), Pa.

BALDWIN-LIMA-HAMILTON

General Offices: Philadelphia 42, Pa. Offices in Principal Cities

Costs less to use!

As THE industry's *highest quality* maintenance material, Permanente 84 keeps steel furnace bottoms in good operating condition with *less material* than usually required.

Thus, it actually *costs less* to use Permanente 84 than materials with a lower initial cost.

Leading steel producers report that Permanente 84, by lasting longer, helps cut down-time for maintenance and repair as much as 50%!

This means Permanente 84 makes possible more steel at lower cost per ton.

Order Permanente 84 now, and get that extra tonnage! It's your *best buy* for bottom, bank and tap hole maintenance. Also ideal for open hearth and electric furnace rebuilds.

For complete information contact *Kaiser Chemicals Division,* Kaiser Aluminum & Chemical Sales, Inc. Regional sales offices: OAKLAND 12, California, 1924 Broadway; AKRON 8, Ohio, First National Tower; CHICAGO, 518 Calumet Bldg., 5231 Hohman Ave., Hammond, Indiana.

Kaiser Chemicals

Pioneers in Modern Basic Refractories

Basic Refractory Bricks and Ramming Materials • Dolomite • Magnesia • Magnesite • Alumina • Periclase

shipping cranes, car dumpers, coke oven machinery, open-hearth charging machines, forging manipulators, clamshell and dragline buckets and power cylinders. The locomotive crane organization will be known as the Wellman-Browning Locomotive Crane Division. Truck and wagon cranes will continue to be manufactured by Browning Crane & Shovel Co.

Reliable Spring Expanding

Reliable Spring & Wire Forms Co. enlarged its quarters at 3167 Fulton Road, Cleveland, and added more manufacturing and heat-treating facilities for handling beryllium, nickel, tungsten and other relatively rare alloys. A. G. Polenschat has been elected vice president for manufacturing; R. F. Pond, vice president for sales; R. E. Anderson, treasurer; and S. Sterling McMillan, secretary. The firm makes mechanical springs, spring stampings, coils and other related wire parts.

New Orleans Firm Organized

U.S. Industrial Engineers & Constructors were organized in New Orleans. Four companies got together to form the new unit: R. P. Farnsworth & Co. Inc., James F. O'Neil Co., Walter J. Barnes Electric Co. and de Laureal & Moses, consulting engineers. Their combined resources total $5.5 million.

Forms Technical Sales Unit

Kaiser Aluminum & Chemical Corp.'s Chemicals Division, Oakland, Calif., established a technical sales department with George C. Davis Jr. as technical sales manager.

Ferro Buys Louthan Mfg. Co.

Ferro Corp., Cleveland, purchased Louthan Mfg. Co., East Liverpool, O., from Harbison-Walker Refractories Co., Pittsburgh. H. T. Marks is president of the Louthan Division of Ferro; C. W. Gerster, executive vice president and general manager; G. E. Weber, secretary and trasurer; George Beck Jr., assistant secretary and treasurer. The division will make refractory specialties for firing pottery and for the foundry field, electrical porcelain insulators and other ceramic products.

Ferro also acquired the patent rights and related assets of Peterson Kiln Co., Los Angles, for production of light, portable continuous kilns.

Rohr Aircraft Engineer Solves Lighting Problem

This partial view of Rohr Aircraft's Riverside, Calif., plant shows the new lighting system developed by C. C. Clardy, staff assistant of plant engineering. Sheet aluminum and stainless steel, having bright reflective surfaces, present a problem of glare and yet one can see scribed lines on such sheets only by the reflection of the bright sides of those lines. A compromise was made between too much glare on the surface and too little on the lines: Fluorescent and mercury lights were combined for ultimate eye comfort of the firm's workers

Climax-Merck Plan Venture

Climax Molybdenum Co. and Merck & Co. Inc., New York, have submitted a joint bid for one of eight government-owned chemical plants for the manufacture of butadiene, the largest raw material component of GR-S synthetic rubber. Butadiene is an important and highly reactive organic chemical compound which may have possibilities in fields beyond its major use in synthetic rubber.

The transaction cannot be completed until March, 1955, at the earliest. If a plant is acquired, the two companies will operate it as a joint venture. For Climax, the bid is another step in diversification. In addition to molybdenum, Climax is a producer of uranium, vanadium and tungsten. It also has some investments in oil properties.

Equipmentmaker Changes Name

Phillips Mine & Mill Supply Co., Pittsburgh, changed its corporate name to Phillips Corp. The company makes materials handling equipment for the automotive and general metalworking industries. The company will move about Aug. 1 to a 60,000-sq-ft plant in Rosslyn Farms, Pa.

Fletcher Incorporates Firm

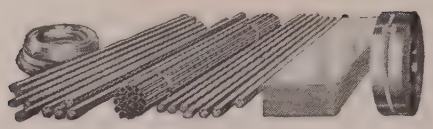
Austin F. Fletcher Inc. was formed in Binghamton, N. Y. This organization will offer sales of chemicals, equipment and metal finishing processes to the metalworking industry. A. F. Fletcher is president and general manager; Warren Fletcher, vice president.

Nickel Refinery Opens

Sherritt Gordon Mines Ltd., Toronto, Ont., is operating its gas reform and anhydrous ammonia plants at Ft. Saskatchewan, Alta., in excess of rated capacity. These are the first units of its $24-million nickel refinery which embodies

(*Please Turn to Page* 92)

(Advertisement)

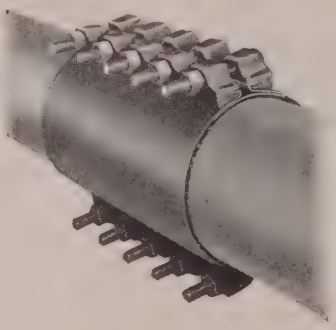


BRIDGEPORT BRASS COMPANY

COPPER ALLOY BULLETIN

BRASS Bridgeport CO. MILLS IN BRIDGEPORT, CONN. AND INDIANAPOLIS, IND.—IN CANADA: NORANDA COPPER AND BRASS LIMITED, MONTREAL

Full Circle Clamp Coupling—copper strip for the band and Silicon Bronze screws and nut fasteners give strength and corrosion resistance. Courtesy Smith-Blair, Inc., South San Francisco, Calif.



Bronze Service Clamp for connecting risers. The cast bronze saddle and Neoprene gasket are assembled with a Silicon Bronze U-bolt and nuts for strength and long service life. Courtesy Smith-Blair, Inc.

Copper and Silicon Bronze Improve Repair and Service Clamps

Dependability, ease of installation, and excellent resistance to water and soil corrosion are characteristics of the metals used in the construction of clamps for sealing leaks, coupling pipes, and for service connections.

Illustrated is a Smith-Blair full-circle clamp coupling made from two half-circle bands of cold rolled, tough pitch copper, lined with molded rubber gaskets bonded to the copper. When firmly clamped together by means of high-strength silicon bronze bolts and nuts, this clamp enables one man to permanently repair a broken or cracked pipe in a few minutes with a minimum amount of excavating.

The fact that copper is flexible, as well as enduring, was an important factor in its selection. The heavy copper sleeve gives uniform distribution of the clamping pressure without crushing. This is very desirable for coupling cast iron, and especially for cement-asbestos pipe.

Silicon Bronze for High-Strength Service Clamps

The bronze service clamps are constructed with U-bolts made of silicon bronze wire or rod. Bolts made from Bridgeport's Silicon Bronze (609) (approx. 98% copper, 2% silicon) have a tensile strength of approximately 90,000 psi. Silicon bronze is so close to copper in the electromotive series that there is no danger of galvanic corrosion between the copper sleeve and the silicon bronze bolts. It also has the corrosion resistance of copper as well as the toughness of mild steel.

Silicon bronze is an engineering alloy that is fast replacing perishable metals for all types of fasteners. It is widely used in the electrical and marine fields for the construction of wire and cable connectors, pole-line hardware, marine hardware, sewage and waterworks, industrial equipment, valves, controls and all varieties of bolts, nuts, nails, and screw products used for outdoor construction.

Call on Bridgeport for Copper or Copper-Base Alloys

Bridgeport's Laboratory will be glad to cooperate with you in providing the right metal for your specific purpose. To obtain help on your metal problems or requirements, please contact your nearest Bridgeport office. Write for your copy of Bridgeport's "Technical Handbook" on company letterhead.

Duronze III Stops Accidents

The gate on the safety hook illustrated depends upon a lock pin made from Duronze III for controlling its opening and closing. The gate cannot be opened until the pin is pressed in.

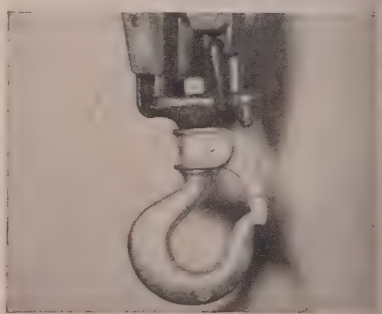
Since the pin must function under all conditions, even when not lubricated, Duronze III (707) rod, an alloy of high strength and with excellent corrosion and wear resistance, was selected.

The sleeve for the pin is made from Ledrite 6 Brass rod because there is a low coefficient of friction between these two metals. The gate itself is cast Red Brass, and the washer on top of the hook is bearing bronze. The wide use of copper-base alloys reduces corrosion and prevents the freezing of moving parts when exposed to water and moisture even for long periods.

Duronze III (707), with 91% copper, 7% aluminum and 2% silicon, is supplied in rod form only, and has a tensile strength in the annealed state of between 85,000 and 90,000 psi. It answers the product designers' demand for high functional strength and, at the same time, eases the problems of the tool engineer and production department by its good machinability, which is 60% of free machining brass.

For additional information on Duronze III alloy, write for the Duronze Manual.

The safety pin made from Duronze III (Silicon Aluminum Bronze) controls the cast bronze gate which prevents the load from slipping off the hook. Courtesy C. D. Bullard Co., San Francisco.



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CAUSES OF CORROSION

This article is one of a series of discussions by C. L. Bulow, corrosion metallurgist of the Bridgeport Brass Company.

COPPER AND COPPER ALLOYS vs. SODIUM CHLORIDE SOLUTIONS (Cont.)

Effect of Anodic Currents

Anodic currents will increase the corrosion of copper, copper alloys and most commonly used metals in sodium chloride solutions.

Bialosky[1] has shown that dezincification of Muntz Metal and Naval Brass can be considerably accelerated by applying an anodic current to these metals in sodium chloride solutions. An increase in the anodic current density accelerated dezincification. Under the same test conditions, inhibited brasses such as Arsenical Muntz Metal and Arsenical Naval Brass did not suffer from dezincification. While under service conditions the stimulation of dezincification or pitting by an externally applied current is uncommon, the possibility of its presence as a corrosion accelerating factor should not be overlooked. The generation of a current produced by a galvanic cell is also likely to stimulate dezincification or pitting and is occasionally encountered.

Unsatisfactory Galvanic Couples

High zinc brasses, such as Muntz Metal, Naval Brass, Yellow Brass and similar alloys, coupled to a less active metal, such as graphite, platinum, gold or silver, may suffer from accelerated dezincification due to current produced by the galvanic cell. Colgate[2] states that "contact of brass with graphite may give rise to serious dezincification" and that he has seen "dezincification caused in this way in various pieces of apparatus in which compressed graphite components have been in contact with brass. In another instance, through a misunderstanding, a graphite paint was applied to a Muntz Metal casting exposed to sea water and most serious dezincification took place very rapidly at damaged parts of the coating." (See August, 1952 Edition of this column.) Galvanic currents produced in this manner would also be expected to lead to increased general corrosion or pitting of the higher copper alloys (anodic) in sodium chloride solutions when coupled to materials less active (cathodic) than copper and copper alloys in sodium chloride solutions.

Galvanic Corrosion of Magnesium

We are generally more concerned with the galvanic corrosion of more active metals coupled with copper and copper alloys where the latter materials are protected by this current and the more active metal corrodes at an accelerated rate.

The results of a study on galvanic corrosion of magnesium alloy (6% aluminum, 3% zinc, .2% manganese, balance magnesium) in 3% sodium chloride solution connected with equal areas of (4 x 1.3 x 0.2 cm) various metals in close contact and up to 10 cm apart in 3% quiescent solution at room temperature, have been reported by Loose[3] and are shown in the table.

These data are very interesting since they show not only the effect of close contact and various degrees of separation between the magnesium alloy and the cathodic material, but they also show that steel, nickel and certain aluminum alloys have stimulated galvanic corrosion of magnesium to a greater degree than copper or brass. This clearly shows the importance of actual galvanic tests to determine the relative effects of coupling various metals together in any given environment and that the other metal or preferably both metals should be coated in order to avoid galvanic corrosion. Electrical insulation is also advisable.

Galvanic Corrosion of Magnesium Alloy (Anode) in 3% Sodium Chloride Solution

Cathode	Close Contact	Separation 0.35 cm.	Separation 2.0 cm.	Separation 10 cm.
Steel	23,400 mdd.	25,500 mdd.	8,300 mdd.	3,800 mdd.
24S-T Aluminum	12,800 mdd.	25,700 mdd.	6,800 mdd.	3,200 mdd.
Nickel	18,800 mdd.	22,400 mdd.	6,600 mdd.	—
2S Aluminum	14,500 mdd.	15,600 mdd.	4,100 mdd.	—
Copper	8,500 mdd.	8,200 mdd.	3,700 mdd.	—
Brass	7,100 mdd.	4,000 mdd.	2,500 mdd.	1,700 mdd.
56S Aluminum	—	1,900 mdd.	—	—
Cadmium Plated Steel	5,200 mdd.	2,200 mdd.	1,000 mdd.	—
Zinc	6,200 mdd.	1,300 mdd.	900 mdd.	700 mdd.
Mg. 1.5 Mn.	—	50 mdd.	—	—
Mg.-6% Al, 3% Zn, 0.2% Mn.	—	200 mdd.	—	—

NEW DEVELOPMENTS

This column lists items manufactured or developed by many different sources. None of these items has been tested or is endorsed by the Bridgeport Brass Company. We will gladly refer readers to the manufacturer or other sources for further information.

Flanged Milling Machine Vise with swivel base offers precision construction and rugged holding service for milling, drilling, grinding, etc., it is reported. Unit has jaws 6″ wide and 2″ deep, and opens 6″. Removable ground steel jaw plates are provided. Unit can be used with or without 360° graduated swivel base. **No. 1389**

Portable Hardness Tester uses ⅛″ ball with 150kg load on all types of ferrous and non-ferrous sheet metal from 0.010″ to 0.250″, manufacturer states. Ball is spring loaded for constant calibration; pressure is applied by special parallel jaw pliers. Battery illuminated microscope and reticle gives accuracy reported at within two points on directly read Brinell scale. **No. 1390**

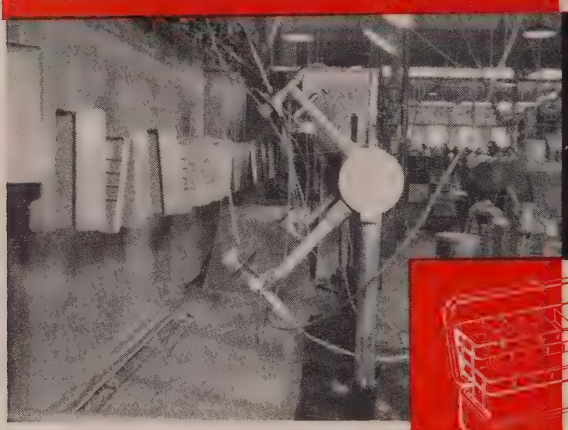
Electric Oil Heaters combine low watt density and finned tube heating surface with automatic oil temperature control and instant starting, maker claims, for efficient heavy fuel oil heating. Excess oil pumped is returned to the heater through oil return connection provided on the heater, instead of recirculating through tank. **No. 1391**

Nondestructive Sorting Unit will check ferrous or non-ferrous stock or processed parts by metallurgical characteristics such as hardness, structure or case depth, maker reports. Instrument can be used either as hand sorter or in automatic operation. Typical parts inspected include bolts, valves, bearings, forgings, castings, piston rings and bar stock. **No. 1392**

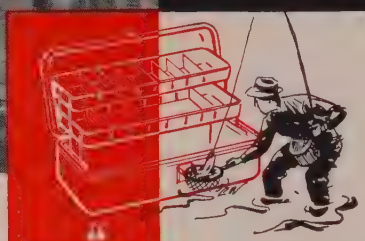
1. J. M. Bialosky, Corrosion and Material Protection, 4, 15 (1947)
2. G. T. Colgate, Metal Industry, 73, 26, 507-509 (Dec. 24, 1948)
3. W. L. Loose, page 228, Corrosion Handbook, Ed. H. H. Uhlig, John Wiley & Sons (1948)

BRASS, BRONZE, COPPER, DURONZE, NICKEL SILVER, CUPRO NICKEL
BRIDGEPORT BRASS
BRIDGEPORT BRASS COMPANY, BRIDGEPORT 2, CONN. • ESTABLISHED 1865
Mills at Bridgeport, Connecticut, and Indianapolis, Indiana • In Canada: Noranda Copper and Brass Limited, Montreal
Warehouse Service with Slitting Facilities in Principal Cities
(Advertisement)

World's Largest Manufacturer of Tackle Boxes and Minnow Buckets uses the World's Finest Electrostatic Paint Spray



THE RANSBURG NO. 2 PROCESS



Four 3" Atomizing heads are used in the Ransburg No. 2 unit to paint fishing tackle boxes in the Stratton & Terstegge plant in Louisville, Kentucky.

Stratton & Terstegge Co., Inc., in Louisville, is the world's largest producer of fishing tackle boxes and minnow buckets. Their products—in a variety of styles and finishes—are sold under the trade names of "My Buddy" and "Falls City."

Originally, the company hand sprayed both exteriors and interiors of the tackle boxes. Then, in 1947 efficiency was stepped up when they installed a Ransburg No. 1 Process to coat the box exteriors.

Now, Stratton & Terstegge uses the Ransburg No. 2 Electrostatic Paint Spray which enables them to achieve even further efficiency. Paint savings amounts to 25%, and production is increased 10% with the Ransburg No. 2 over the No. 1 Process! Rejects are practically nil . . . quality of the work is improved . . . clean up time and maintenance is cut to a minimum . . . there's no compressed air to worry about, for the paint particles are electrostatically atomized with the Ransburg No. 2.

Although labor and material costs have increased substantially the past two years, the improved and more efficient plant operations have enabled this company to continue to produce their products at NO increase in price to the ultimate consumer.

Want to know how the Ransburg No. 2 can help cut costs in your painting department and still provide a higher quality and more uniform finish? Write for our brochure which shows numerous on-the-job examples of the Ransburg No. 2 Process.

Ransburg ELECTRO-COATING CORP.
Indianapolis 7, Indiana

RANSBURG

(*Continued from Page 89*)

a chemical process for extracting and refining nonferrous metals from their ores, thus by-passing conventional smelting and refining techniques. Completion of the final units is expected by the end of this month.

Nickeloid Opens Branch Office

American Nickleloid Co., Peru, Ill., maker of pre-plated metals in sheets and coils, opened a sales office in the Western Saving Fund building, Philadelphia. Simultaneously, the firm revealed that it has closed its Detroit office.

Float Your Car?

AUTOMOBILE drivers in Providence, R. I., may be invited soon to "float" their cars, rather than park them.

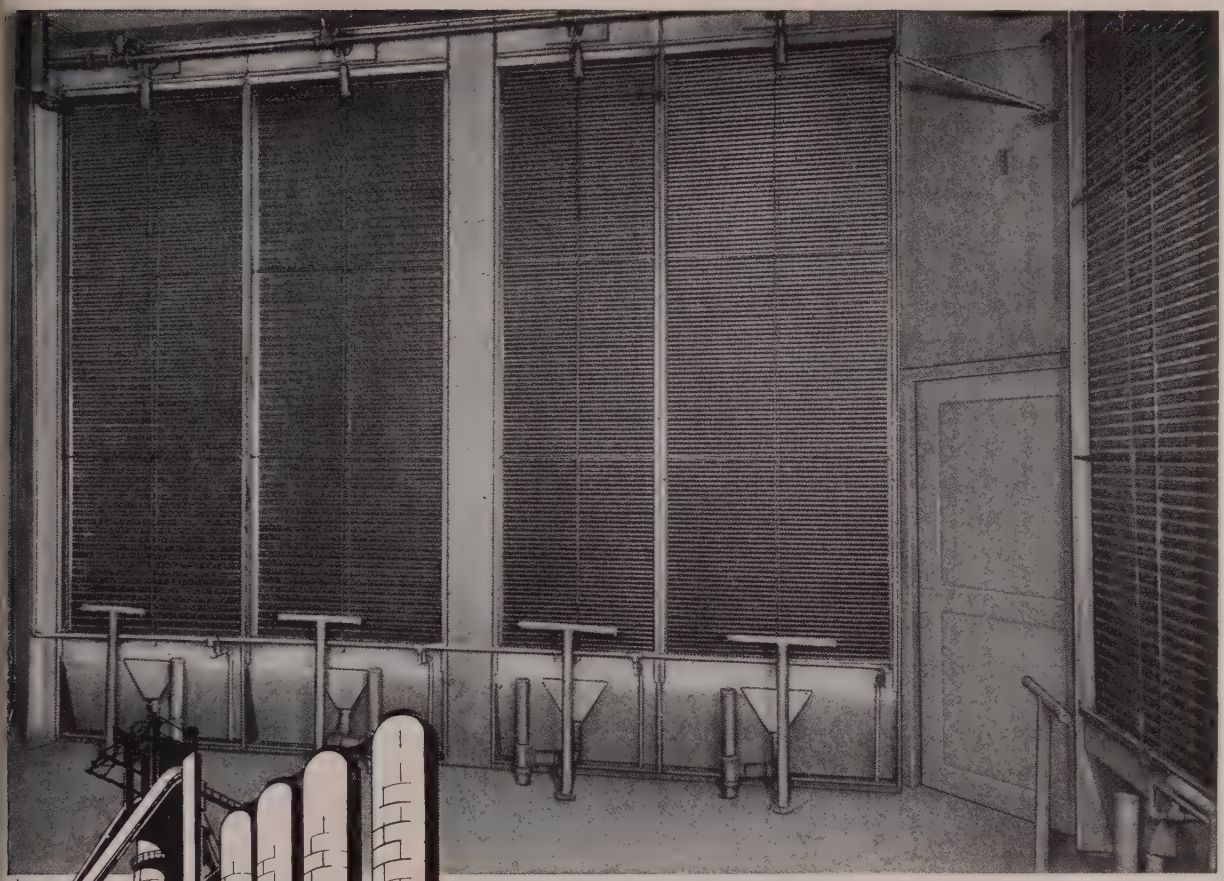
Philip A. Ostrove, garage and parking lot operator in that city, has barged in with a novel proposal on parking. He thinks steel barges might help solve Providence's parking problem. He'd moor them in the Providence river where downtown congestion — and available land—is tightest. To get his plan afloat, Mr. Ostrove currently is studying barge costs and navigation laws.

Will Build Plant in Canada

Ardelt Industries of Canada Ltd., Toronto, Ont., will establish a plant in Kitchener, Ont. The firm is a subsidiary of Ardektwerke, G.m.b.h., Wilhelmshaven, West Germany, manufacturer of cranes, hoists, shovels, medium and heavy materials handling equipment, loading bridges, foundry machinery and diesel-shunting locomotives.

A. P. Green Buys London Firm

A. P. Green Fire Brick Co., Mexico, Mo., purchased Liptak Furnace Arches Ltd., London. The British company has been manufacturing refractory specialty products under license from the Green company, and has designed and supplied suspended refractory



Rear view of an actual blast furnace installation showing 4 sections of a MULTI-DUTY Air Filter—Capacity of 105,000 cfm.

it takes **CLEAN AIR** to operate a blast furnace **AT A PROFIT**

The mighty volumes of air fed to the hungry blast furnaces of the nation are dependent upon a number of mechanical factors. One of these is the rotary compressor. And, despite their appearance, these big, rugged machines are vulnerable to the billions of tiny abrasive particles found in the air. If the intake air is not thoroughly cleaned *before* it reaches the impellers — minute abrasive dust particles are intercepted by the impeller blades and their abrasive action will quickly wear the blades, resulting in "down time" for repairs.

The AAF MULTI-DUTY filter has proved the solution to this problem. These time-tested units have been performing reliable and economical service in some of the nation's biggest steel mills for years. They remove dust and dirt particles from the intake air before it reaches the impellers. Thus costly replacements and "down time" are minimized and efficiency is maintained when the MULTI-DUTY automatic air filter is on the job. To get the facts about the AAF MULTI-DUTY filter — please write for Engineering Bulletin No. 241.

AAF

American Air Filter

COMPANY, INC.

443 Central Avenue, Louisville 8, Ky.

American Air Filter of Canada, Ltd., Montreal, P. Q.

arch and wall construction under license from Bigelow-Liptak Corp., Detroit, an A. P. Green subsidiary.

NEW ADDRESSES

Dumas-Caine Steel Co. moved its offices and warehouse to 1315 Chattahoochee Ave., Atlanta. New materials being offered by this distributor include steel plates, tubing, flat wire, cold-rolled bars, and stainless steel sheets.

American Machine & Foundry Co. moved its executive, administrative and sales offices to 261 Madison Ave., New York 16.

Industrial Machinery Rebuilding Co. moved to an enlarged plant at 2910 Santa Fe St., Los Angeles.

Lockheed Aircraft Corp. moved its expanding Missile Systems Division to larger quarters at 7701 Woodley Ave., Van Nuys, Calif. Elwood R. Quesada, vice president and general manager, is in charge of the plant.

Manhattan Wire Goods Co. Inc. moved its offices and plant to 32-24 Hunters Point Ave., Long Island City, N. Y.

Bridgeport Brass Co. opened its new New York warehouse and offices and transferred its New York sales and service offices to 48-49 33rd St., Long Island City, N. Y.

Grieve-Hendry Co. Inc., maker of laboratory and industrial ovens, moved its factory to larger quarters at 1401-17 Carroll Ave., Chicago 7.

Koppers Co. Inc. moved its New York consolidated sales office to 430 Park Ave., between East 55th and 56th streets. The firm's divisions sharing the quarters include Chemical, Tar Products, Wood Preserving and Metal Products.

Producto Machine Co., Bridgeport, Conn., moved its Rochester, N. Y., branch to 1300 Mt. Read Blvd. The building houses a die set assembly plant and carries a more complete stock of catalog die sets, diemaker's accessories and tool room equipment. David S. Hodgson is district sales manager.

Worthington Corp., Harrison, N. J., manufacturer of pumping, industrial, construction, air-conditioning and refrigeration equipment moved its Twin Cities district office to 807 13th Ave., Minneapolis. W. M. Fine is district manager.

ASSOCIATIONS

National Industrial Advertisers Association named George L. Staudt, advertising manager, Harnischfeger Corp., Milwaukee, chairman of the board. It's the

GEORGE L. STAUDT
. . . NIAA board chairman

new top elective post in NIAA provided by a change in constitution and by-laws voted by members at their annual convention in Montreal. Blaine G. Wiley, executive secretary, becomes president; and Henry W. Leland, General Electric Co., Schenectady, N. Y., secretary-treasurer. NIAA, founded in 1922, is made up of 4500 industrial advertising men in the United States and Canada.

A West Coast district section of **Association of Iron & Steel Engineers,** Pittsburgh, has been organized with W. A. Marshall, works engineer, Pittsburg, Calif., plant of Columbia-Geneva Steel Division, U. S. Steel Corp., nominated as its first chairman.

The following have been nominated as officers of **American Society for Metals,** Cleveland, for 1954-55: President, G. A. Roberts, Vanadium-Alloys Steel Co., Latrobe, Pa.; vice president, A. O. Schaefer, Midvale Co., Nicetown, Pa.

B. E. Schonthal requested the officers and executive board of **Illinois Minning Institute,** Chicago, to relieve him of his duties as secretary-treasurer of the Institute, by July 15.

VACATIONS

James Coulter Machine Co., Bridgeport, Conn., will close its plant for vacation from July 3 to July 12.

C. B. Hunt & Son Inc., Salem, O., will close its plant from July 5 through July 17 for employee annual vacations. The firm's receiving department will be closed from July 5 through July 10.

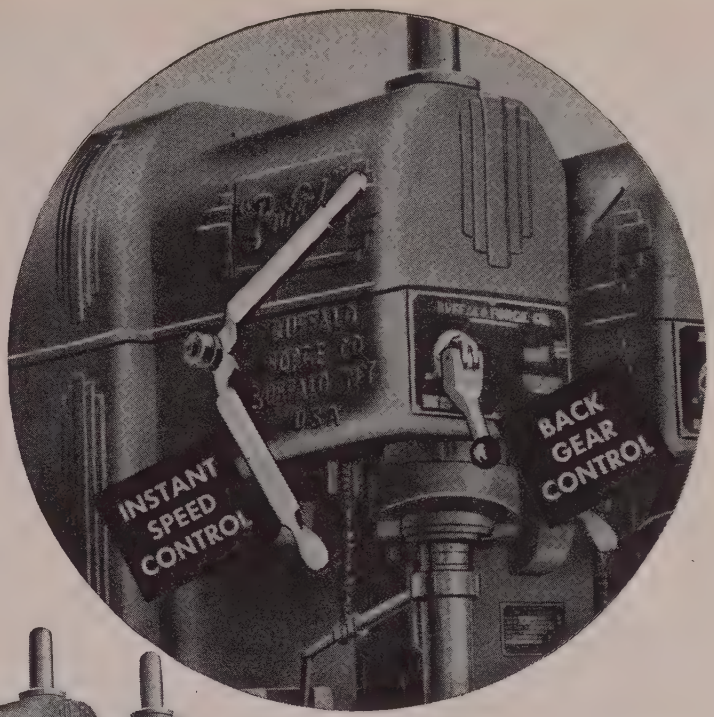
Warner & Swasey Co. will close its manufacturing plants in Cleveland and New Philadelphia, O., from July 19 through Aug. 8, inclusive, for employee vacations. No outgoing shipments of the firm's products will be made or delivery of incoming materials received at these plants during the vacation period.

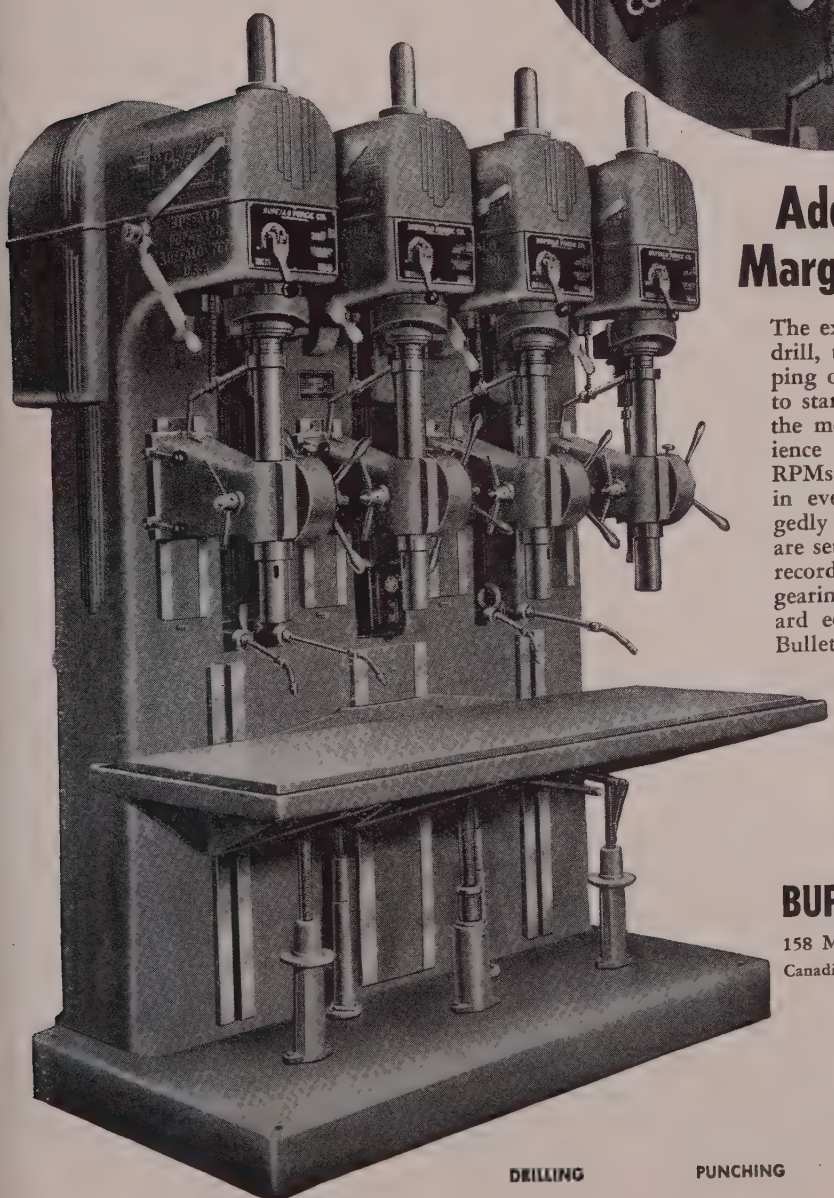
Ohio Steel Foundry Co., Lima, O., has closed its plants in that city and Springfield, O., for two weeks through July 11 for vacation.

Republic Mfg. Co., Cleveland, will shut down for vacation from July 2 through July 11. The firm asks that no inbound shipments be made during this period. A skeleton crew will be on hand to take care of emergency requirements in both the plant and office.

Landis Machine Co., 411 E. Gano Ave., St. Louis, will close its plant for vacation from July 1 to July 19. No shipments will be accepted during this period.

These 2 LEVERS on the RPMster





Add an Extra Profit Margin To Your Drilling

The exact required speed for the size of drill, the material hardness or the tapping or reaming operation you're about to start—instantly, without shutting off the motor! It's not only a big convenience to the operator of the "Buffalo" RPMster, but it saves valuable minutes in every operation. These heavy, ruggedly built "drills with 1001 speeds" are setting some excellent profit-drilling records in shops industry-wide. Back gearing and power feed, too, are standard equipment. Better write today for Bulletin 3257A for the facts on these machines that all but think for the operator!

"Buffalo"

BUFFALO FORGE COMPANY

158 Mortimer St. Buffalo, New York

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

DRILLING PUNCHING SHEARING BENDING

MACK-HEMP striped red wabbler rolls have what it takes for PLATE MILL productioneering

There's a Mack-Hemp roll with just the right physical and metallurgical characteristics for every plate mill requirement—whether for roughing or finishing.

In heavy roughing applications cast steel TECHNALLOY rolls *have what it takes* to maintain rolling schedules.

Strong and tough Mack-Hemp NIRONITE rolls have the fine grain structure you need for intermediate and finishing passes.

And for mills rolling floor plate there's MIDLAND SUPERALLOY, a special alloy roll with the controlled hardness so essential to good product finish.

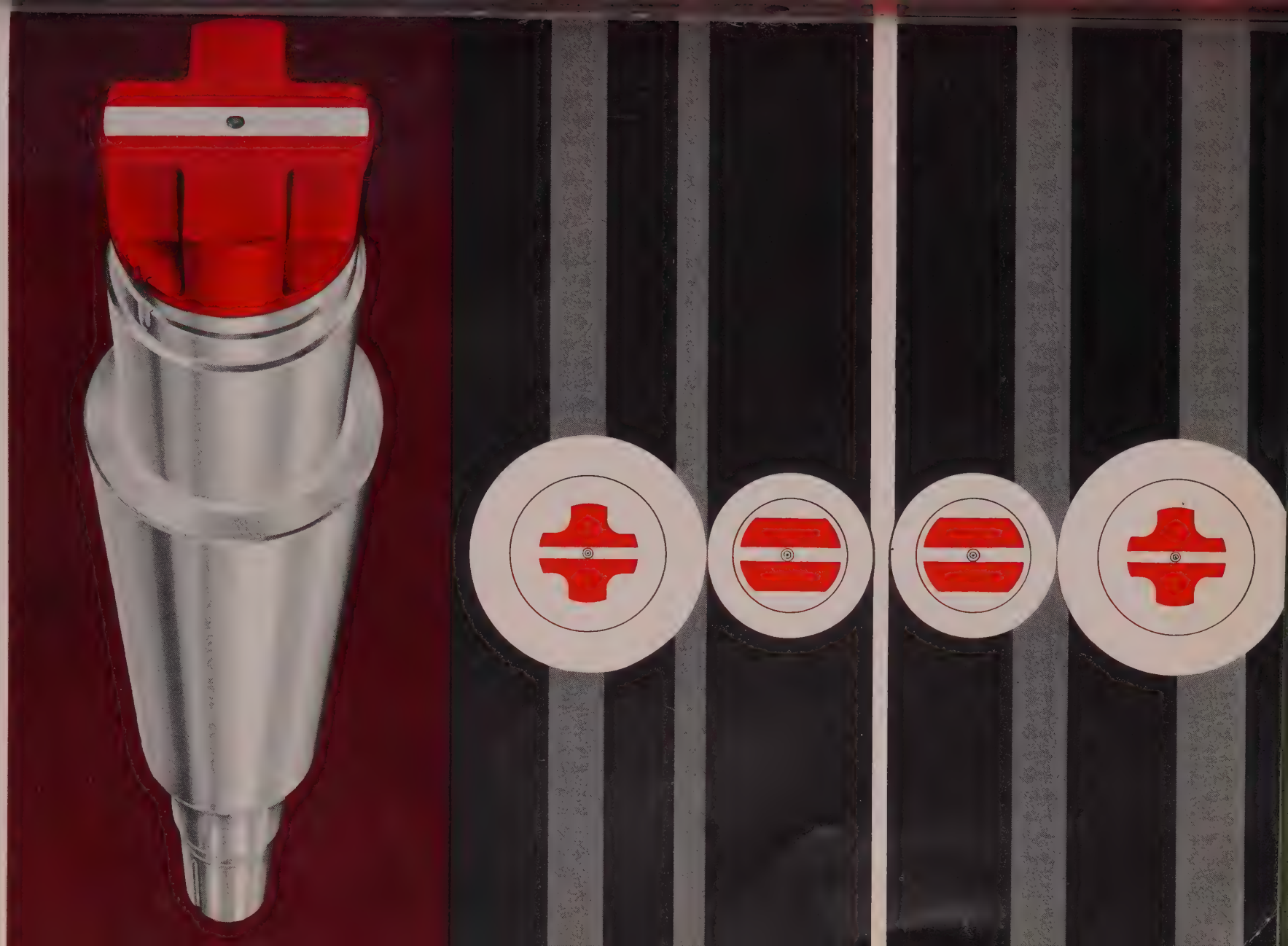
But the important thing to remember is that Mack-Hemp makes rolls for every type of mill, rolling any kind of rolled-metal products. That's why you can always be sure of the best rolls for low cost operation just by keeping an eye on what's new at Mack-Hemp.

MACKINTOSH-HEMPHILL COMPANY

Makers of the Rolls with the Striped Red Wabblers

PITTSBURGH AND MIDLAND, PA.

MACKINTOSH-HEMPHILL PRODUCTS INCLUDE: all types of cast mill rolls . . . improved Johnston patented corrugated cinder pots and slag handling equipment . . . Mackintosh-Hemphill rotary straighteners—electronically controlled contouring lathes—screw feed roll turning lathes—heavy-duty engine lathes . . . shears . . . end-thrust bearings . . . steel and special alloy castings . . . reversing hot strip mills . . . Y-type cold strip mills



Why Clark Equipment Co. started a new Machine Tool Replacement Program

This manufacturer became intrigued with the possibilities in Hi-Velocity Turning, and sent a man to one of J&L's periodic Production Seminars in Springfield to get detailed information.

What this man saw and heard in a two-day exposition of J&L's research findings convinced him that Hi-Velocity Turning offered unusual opportunities for improving quality and cutting costs. He urged his management to send other production men to Springfield for indoctrination. Subsequently, nine Clark men attended J&L Seminars. The result — a sweeping change in the company's production program.

"When we found that we could not reap the benefits of Hi-Velocity Turning because our existing equipment was inadequate, we started a planned replacement program immediately".

M. A. DALRYMPLE
Mechanical Supt.
Clark Equipment Co.

PRODUCTION P.S. STUDIES → *Use of J&L's new findings is resulting in better quality and lower costs throughout industry. Write for details.*

JONES & LAMSON MACHINE COMPANY

517 CLINTON ST., SPRINGFIELD, VERMONT, U. S. A. • TURRET LATHES • FAY LATHES
THREAD & FORM GRINDERS • OPTICAL COMPARATORS • THREADING DIES

STEEL

June 28, 1954

Technical Outlook

CATALYZED PAINTING— Look for new advances in spray painting focused around the many possibilities of fast drying heavy coats from catalyzed spray. DeVilbiss Co., Toledo, has developed equipment using a spray gun equipped with a two-stage external mix cap to give thorough mixing of catalyst and resin in sprayed film. Coatings 8 to 10 mils in thickness can be put down on steel structures in one pass. Coatings up to 40 mils thick can be produced without cure in-between. Method also lowers cost of finishing glass fiber reinforced auto bodies.

MORE STRENGTH FROM POWDERS— Tests in at least one large metallurgical laboratory have demonstrated the possibility of raising the strength of powder metal parts as much as two to three magnitudes by vacuum furnace sintering.

MORE TITANIUM IN SIGHT—The titanium race seems to be coming to life with the prospect that Electro Metallurgical Co. will construct a plant with a sponge capacity of 10,000 tons a year, at Ashtabula, Ohio. New process for the metal was developed in Electro-Met's research laboratories. It will use high vacuum furnaces and probably a reducing agent other than magnesium, now being used for the Kroll process, which accounts for all current production.

NEW INSPECTION—SIMAC is the designation Sperry Products Co., Danbury, Conn., has coined for Sonic Inspection Measurement and Control. Latest SIMAC installation has just started operation at Allison Div., GMC, for automatic inspection of rotor forgings by ultrasonic means. Equipment is designed for repetitive inspection of a variety of pieces that are circular in plan. A part is scanned automatically and results are recorded simultaneously on a circular chart. The record made remains a plan representation of the inspected part.

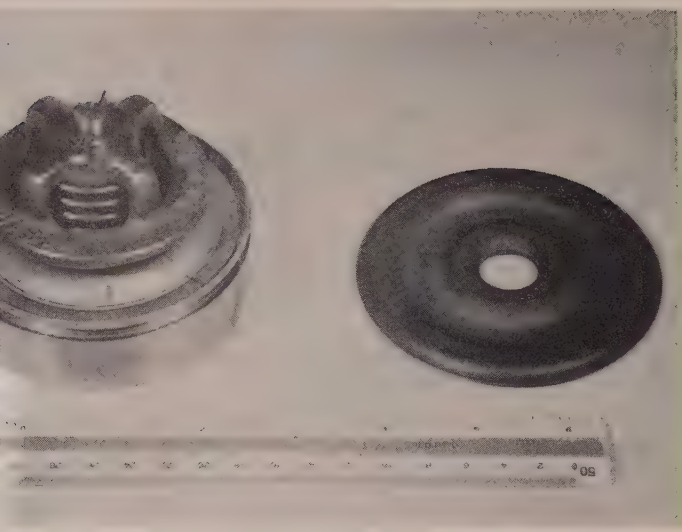
SIMPLIFIED PROCUREMENT— Defense Standardization Program has target date of July 1, 1955, for completion, Capt. C. R. Watts, staff director, Standardization, Dept. of Defense, told the ASTM meeting in Chicago recently. Program has many objectives, including: Consolidation of specifications of the different services, replacement of orders for small quantities of a wide variety of items with orders for larger quantities of a smaller variety, reduction in sizes, kinds and types of items carried as spare parts.

KEEP UP— Progress in commercial electropolishing and chemical polishing has depended on: 1. Finding practical methods that production people can use; 2. development of metal suitable for polishing; 3. wider understanding among fabricators of advantages of solution-polishing techniques. Dr. Charles L. Faust, chief of Battelle's Electrochemical Engineering Div., says development of methods is running ahead of the other two factors.

FAST SOLDERING—Joint strengths comparable to conventional soldering methods can be made with tin-lead plated parts clamped together and heated to soldering temperatures, according to General Electric Co.'s Electronics Park Plant, Syracuse. Method also works with aluminum with a 0.0002-inch copper undercoat used as base for the lead-tin alloy plate. A 50-50 lead-tin alloy composition gives maximum strength. G-E says that storage of plated parts before soldering does not affect joint strength.

TREATMENT FOR LEAD POISONING—A new therapeutic agent, which has been employed in the treatment of lead and radioactive metal poisoning, among its other uses, should prove of value in many metalworking industries where the lead problem is present. Called EDTA, its real name is ethylenediaminetetraacetic acid.

Metalworking Outlook—p. 47 Market Outlook—p. 149



Heavy gage 17-7 PH sheet is drawn to form shown on the right, then it's given the double heat treatment

Typical Mechanical Properties of PH Stainless Steels

17-7 PH SHEET AND STRIP

Condition	Yield 1000 psi	Tensile 1000 psi	Elong. % 2 in.	Hardness
A	40	130	30	B85
T	100	145	9	C31
TH 950	200	215	8	C45
TH1050	185	200	9	C43
C	185	215	2	C43
CH	240	250	1	C49

17-4 PH BAR AND ROD

Condition	Yield 1000 psi	Tensile 1000 psi	Elong. % 2 in.	R.A. %	Hardness
A	110	150	8	45	C34
H875	175	190	11	45	C42
H1000	160	170	14	54	C37

PRECIPITATION HARDENING—PART 1

How To Work Stainless The Easy Way

You can readily fabricate the PH grades in the received condition. Subsequent hardening can be done with little danger of scaling and distortion. Strength values are high

By DR. A. L. FEILD
Associate Director
Research Laboratories
Armco Steel Corp.
Baltimore, Md.

WORK in received condition, then harden with minimum danger of scaling and distortion—that's what you can do with precipitation hardening stainless steels.

Relatively inexpensive and durable, the material offers high yield strength, high modulus of elasticity, reasonable ductility, high strength-weight ratio and a high order of fabrication adaptability.

Newer PH grades, like Armco's 17-7 PH and 17-4 PH, add resistance to marine atmospheric corrosion and high temperature oxidation. They retain much of their strength in the 500 to 600°-F range and can stand up in service at 800° F.

Composition — Both Armco grades contain about 17 per cent chromium (each has its own special advantages in fabrication and end use). The 17-7 PH grade has about 7 per cent nickel, 1 per cent aluminum, while 17-4 PH has about 4 per cent nickel, 4 per cent copper. Aluminum is the precipitation hardening agent in the former, copper in the latter.

Typical analysis of 17-7 PH shows 0.07 carbon, 17 chromium, 7 nickel, 1.10 aluminum; the 17-4 PH grade, 0.04 carbon, 16.50 chromium, 3.75 nickel and 3.75 copper.

Production of flat-rolled products, like sheet, strip and plate, is now confined to 17-7 PH. Forging blooms, billets, bars and wire are available in both grades. Castings of the 17-4 PH type are being produced by a number of firms under license with Armco. They respond satisfactorily to precipitation-hardening treatment throughout their mass, and yield and tensile values approach those of wrought products (both articles in this series are limited to latter).

Applications—Producers and fabricators have developed suitable techniques for welding, brazing, forming, heat-treating and machining. From ingot to finished wrought product the steels are melted, heated, rolled, drawn, heat-treated, descaled and put into finished form with standard steelmaking and steel-processing equipment.

Part was upset and forged from 17-4 PH bar stock, annealed, machined, then heat treated at about 1050°F

These corrosion-resistant steels (selling price falls within the range of standard stainless grades) are being used more and more as components in aircraft, guided missiles, helicopters and atomic energy units. Less spectacularly, they are finding use as springs, valve parts, carpenters' hand saws, diaphragms, police-car antennas, fishing rods and precision castings.

Cases—Drawing properties of 17-7 PH in the austenitic condition is illustrated in the construction of spherical, high-pressure vessels. The 3/16-inch-thick plates are drawn into hemispheres and joined by inert-gas-shielded arc welding. Welded assembly is then annealed and subjected to relatively low heating temperatures.

Hard temper 17-7 PH, produced by heavy cold reduction of annealed sheet and strip, finds application, for example, in hand saws. They equal the features of their best carbon steel counterparts. Another use is spring wire, which equals or surpasses the elastic properties of music wire.

Heat-treated 17-4 PH is being used for a hoisting hook on the F86 Sabre Jet and parts of its emergency apparatus for ejecting the pilot, his seat and parachute.

Their Niche—Typical mechanical properties for both grades in the several conditions in which steel mill products are offered are shown in the table. Properties also meet the most widely used conditions of heat treatment.

It is misleading to evaluate PH stainless steels solely by comparing their mechanical properties in the hardened state with those of hardened or hardened and tempered carbon and low-alloy steels or hardened martensitic straight-chromium steels. Same is true if comparison is made with the high-tensile austenitic stainless steels, such as Type 301, which is produced by cold working.

One of the most valuable features of these new materials is in the nature and sequence of steps by which they are brought to their high-strength condition and the new fabricating and processing procedures made possible.

In the case of these new stainless grades, high-strength properties are not obtained by quenching or cooling from high temperatures, so long regarded as essential to the hardening operation. Thus, scaling and distortion are either avoided or appreciably reduced.

For a clear picture of these differences, it is necessary to describe the essential metallurgical characteristics of the new alloys and the procedures by which they are processed and fabricated.

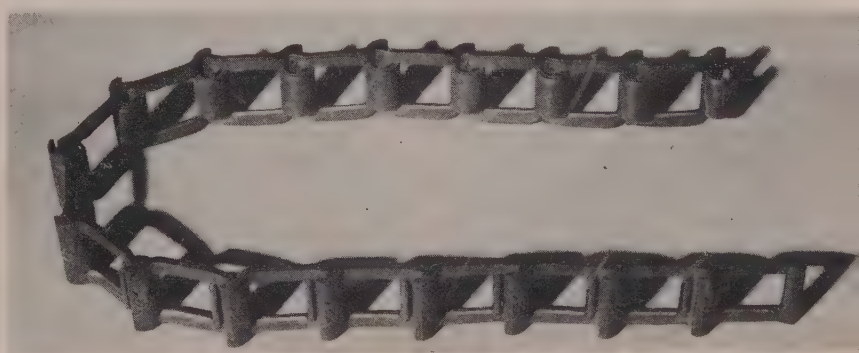
Because 17-7 PH and 17-4 PH differ in some aspects of their metallurgical behavior and in their processing methods, each grade will be dealt with separately (this discussion is confined to the former).

17-7 PH—This grade has two distinct classes, Condition A and Condition C. Condition A material is supplied in annealed or solution-treated condition and includes sheet, strip, plates and bars. Condition C material is sold in the cold-rolled or cold-drawn condition as sheet, strip and wire. Forging blooms and billets are not included because they will be hot worked later by the user.

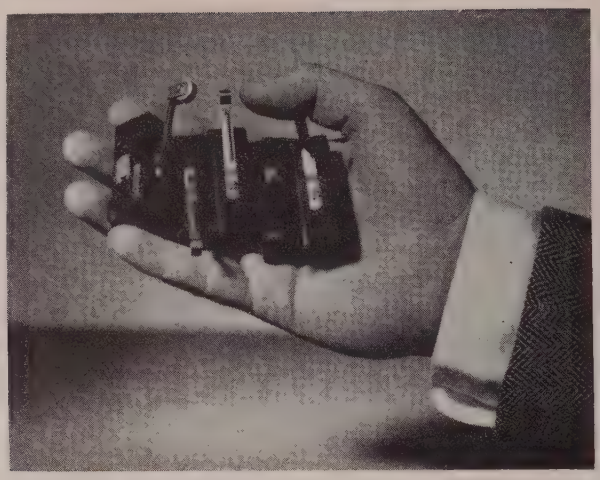
Condition A material, because of its softness and ductility, is intended for application where deep drawing, stretch forming or other severe forming operations are involved.

Form First—The fabricator gives

This detachable link chain was made from 17-7 PH strip and then heat treated to give it its strength



This is the first of two articles on the subject by Dr. Feild. Second, to appear next week in STEEL, will take up 17-4 PH and conclude the discussion of type 17-7 PH.



After heat treatment, micro switches made from 17-7-PH have undergone 100 million reversals of stress

North American Aviation

Section of fuselage for a fighter jet was fashioned from 17-7 PH stainless sheet by stretch forming

the alloy its high-strength properties by two successive heat treatments after forming—the first at 1400° F, the second within the 900 to 1100°-F range. This is called the double heat treatment procedure.

As a result of 1400° F treatment, the structure, which was austenitic with some ferrite, undergoes phase transformation. The metal becomes harder, although not fully hardened. It has an acicular structure resembling martensite, with some retained austenite and ferrite. Because the structure has been transformed, the steel is said to be in Condition T.

Dilatometric measurement shows phase transformation in cooling from 1400° F does not start until about 250° F is reached. The 17-7 PH grade is produced in its original annealed condition by heating at 1950° F, then cooling to room temperature where the alloy is stable—in fact, the annealed material is stable enough to withstand subzero temperatures, which may be encountered in shipment or storage.

Because the chemical composition of the alloy is carefully balanced between austenitic and ferrite-forming components, holding at 1400° F, compared with the 1950°-F annealing temperature, brings about some displacement in phase equilibrium. If there were not some such displacement on holding at 1400° F, the material would remain austenitic on cooling.

Last Step—This is the actual precipitation hardening treatment. After being cooled at least to 60° F (to insure essentially complete transformation), the steel is reheated within the 900 to 1100° F range, held there for an appropriate time and again cooled—this time to room temperature.

Heating at 950° F confers maximum yield and tensile strength, but a 1050°-F treatment is generally recommended because it gives increased ductility and improved corrosion resistance at only a moderate decrease in strength.

Now, the steel is in Condition TH 950 (transformed and hardened), if heated at 950° F or Condition TH 1050, if heated at 1050° F.

Explanation—Final hardening by heating within the low temperature range gives rise to results that are characteristic of a precipitation reaction within a solid metal.

Within the hardening temperature range and for a selected and constant time at temperature, such as one hour, there is a specific temperature where maximum hardness is obtained.

Treatment below the specific temperature in question yields lower hardness because precipitation is not completed. Above the specific temperature, a more ductile product is obtained with a hardness below the maximum. As would be expected, length of time at the hardening temperature has a certain effect on mechanical properties.

Controls—In the 1400°-F treatment, time at temperature of 90 minutes is generally recommended. On cooling to 60° F or lower, the cooling rate in itself is not important, but air cooling or water quenching is preferable.

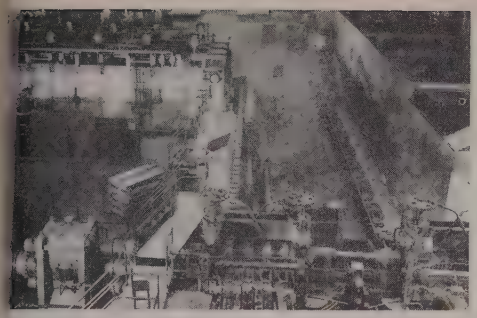
The material should be brought to final low temperature without too much delay—preferably within one hour of furnace discharge; otherwise, high mechanical properties may not be fully attained. This is a matter to be carefully watched. Sometimes the temperature of tap water or that in the quench tank is higher than 60° F. In air cooling, the temperature of the surrounding atmosphere may exceed 60° F by a big margin.

For the final precipitation hardening, a time at temperature of about one hour is usually recommended, after which the material is air cooled to room temperature.

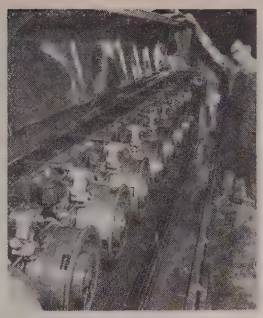
For forging blooms or billets, it is considered good practice to heat to 2150° F for subsequent forging operations and to hold there until temperature is equalized throughout the mass. The forged products may be placed in the annealed condition (A) by heating at 1900° F and subsequent air cooling or water quenching.

It is important to cool through the range of 1200 to 1500° F with reasonable rapidity. In heavier sections, water quenching is indicated; in lighter sections, ordinary air cooling or fan cooling is sufficient.

Thereafter, the regular double heat treatment procedures are followed.



Newark's 10-inch mill consists of 14 sets of trains. Bars make 22 passes



Internal view of 8 and 10-die tandem machine. Carbide dies reduce wire

Pure aluminum wire is stranded for ultimate electrical conductor use

Aluminum Wire By The Mile

Since Kaiser took over the war surplus aluminum rod and bar mill at Newark, O., there've been some changes made. Now it's one of the biggest electrical wire producers

ANYONE familiar with Kaiser Aluminum's Newark, O., plant at the time they bought it from the government in 1948 would scarcely recognize the place now. Originally a rod and bar production operation during World War II, Kaiser has recently completed a building program that makes Newark the biggest single source of weatherproof aluminum electrical conductor in the country.

Besides electrical wire capacity (1.5 million pounds per month), the Newark mill turns out nearly 300 million pounds of rod, bar, wire and extrusion billets. This makes the Newark operation the second largest plant in the Kaiser Aluminum organization, second only to the huge Chalmette, La., reduction plant.

What's New—Virtually the only parts of the mill today which bear any resemblance to the Newark plant of 1948 are the reverberatory remelt furnaces, the 38-inch 2-high blooming mill and the 22-inch 3-high finishing mill. When the decision was made to expand production, existing equipment had to be relocated into about one third the space it originally had occupied.

For their $9 million capital expenditure, Kaiser got an ultra-modern 10-inch finishing mill, coarse and fine wire drawing machines, stranding bays, continuous vulcanizing machines and plastic tuber, banbury mixer, rubber mills, triplers and quadrupler, and complete test facilities for the electrical conductor products.

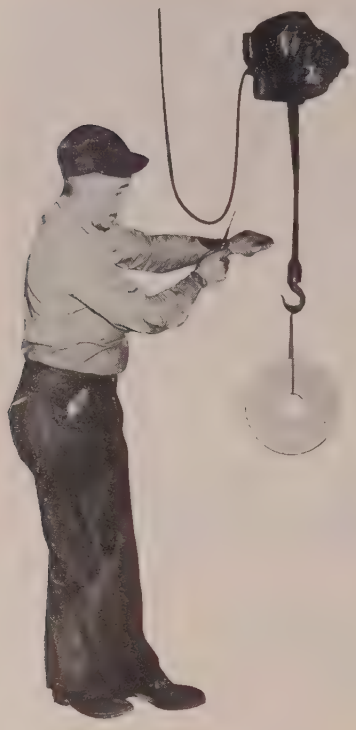
Production Cycle — Aluminum pigs, shipped from the Mead or Tacoma plants, are remelted in the reverberatory gas furnaces and alloyed with the various elements to produce desired characteristics. To produce mechanical rod, bar and wire stock, ingots 9 feet long and 12 inches square are cast. For electrical conductor wire, ingots are usually 12 feet long and 6 inches square. The latter are sawed into 70-inch lengths, preheated to rolling temperature and then rolled in the 10-inch finishing mill which converts the ingot into a ⅜-inch rod nearly one half mile in length in 55 seconds. This mill alone produces some 235,000 pounds of ⅜-inch rod per shift with a 97 per cent yield.

Wire Drawing—Mechanical rod and bar leave the 22-inch or 10-inch mills (depending on size range), get a single draw to size, heat treatment, straightening, and they're ready for inspection and shearing to commercial lengths. But wire stock is just getting started when it leaves the 10-inch mill. Some of it is drawn down as far as 0.0056 inch.

Cycle might start off with two or three passes on a moto block type of machine or a single pass through one of the nine 8 and 10-die tandem drawing machines. If wire is to be finer than 0.064, a pass through a 13-die machine can take it as far as .0226 inch. There are 20 fine-wire machines operating through a maximum of 16 dies to reach the lowest size limit. Intermediate anneals are naturally fitted in whenever the alloy requires it.

Finishing Up—In the case of electrical wire, production windup may consist of stranding around a steel or aluminum core for overhead power lines or covering with insulation to form three different types of covered conductor. Machines for applying neoprene or polyethylene on various types of service drop cable, on weatherproof cable, or on building wire are part of Kaiser's electrical conductor department.

Large volumes of the non-electrical wire go into such applications as welding rods, rivets, nails and wire screening. The Newark plant ships only the wire stock for these commercial uses.



After hardening, these parts are lowered into a chilling unit that is generally set at −120° F

Below Zero Heat Treatment

Process is being used on a production basis for a number of applications: Transformation from austenite to martensite, normalizing castings, shrink fitting, etc.

By ROLLAND S. JAMISON
Assistant to President
Cincinnati Sub-Zero Products Co.
Cincinnati

No. 4 in STEEL's MODERN HEAT TREATING SERIES

SWISS gage makers once aged materials in the mountains to give them stability and high hardness, but the process was slow. It took seven years to get them ready for machining and finishing.

Today, you can reach the same end in a matter of hours with sub-zero chilling.

Process is used on a production basis for: 1. Complete transformation of austenite to martensite—giving stability to precision parts and increased hardness and ductility to perishable tools for longer life. 2. Normalizing and stress relieving ferrous and nonferrous castings. 3. Shrinkage of metals for expansion fitting and assembling.

Stabilization—To stabilize precision devices made of steels fairly high in alloy, three main factors are: Parts must be uniformly hardened by proper heating and quenching; austenite must be completely transformed to martensite; and the martensite must be thoroughly tempered.

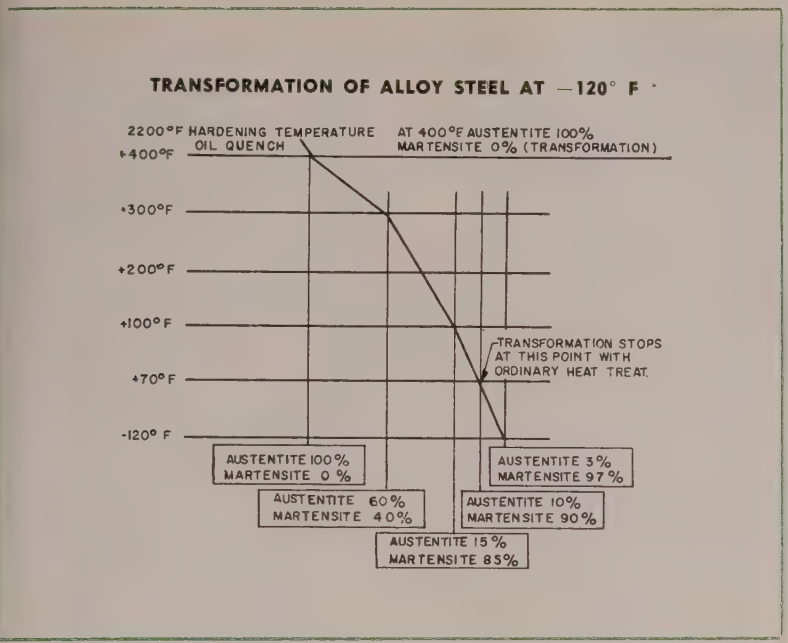
During quenching, transformation from austenite to martensite starts when the temperature of the piece drops below about 400° F—previous to this, steel was 100 per cent austenitic. Going farther down the scale, at 300° F, microstructure is 60 per cent austenitic, 40 per cent martensitic. In ordinary heat treatment, transformation stops at room temperature, with some 10 per cent austenite remaining. But chilling the piece to −120° F reduces it to 3 per cent.

So we find that low-temperature chilling is used to stabilize precision machine parts, gages, arbors, mandrels, aircraft bearings, etc. Ultra-precision parts can grow 20 times beyond the specified tolerance.

Chilling should not be delayed unduly after the steel is near or at room temperature. Austenite will age and make transformation difficult. Holding at or near room temperature one hour has a detrimental effect; ten hours reduces chill treatment efficiency 50 per cent. Time part is held at low temperature and rate of cooling is not critical.

Examples — Typical hardening treatment for high-rate production of precision parts includes a sub-zero chill as part of the quench—followed by the tempering operation. Where 100 per cent transformation of austenite is necessary, it is accomplished by repeated cycles of chilling and tempering. As many as six cycles are used. Care is taken to avoid delay in holding parts at or near room temperature during the process.

Machine tool wear strips (up to 16 feet long) are flame hardened and chilled. Graphitic steel, type 91140, which is partially self lubricating, is used.



Hardened to a minimum of RC 60 and a case depth of ⅛ inch, strips are chilled at −120° F for complete transformation of austenite prior to tempering and straightening.

Toughening—If a tool retains austenite, it develops grinding checks faster than one without it. This brittleness also is evident in premature wear. You can get rid of retained austenite with subzero treatment. Maximum hardness and a gain in ductility result.

A manufacturer of hydraulic-pump thrust rings had grinding difficulties due to distortion. Material used was 8620, a carburizing steel with high nickel content. Distortion was traced to retained austenite in the carburized case, when quenched from carburizing or reheating temperatures. With an extended temper at highest possible temperatures, distortion was not eliminated or helped. Required hardness was not maintained.

Problem was licked with a subzero chill to −120° F after the mar quench and before tempering. Complete transformation gave a hardness of RC 64 to 65, and distortion was eliminated. Grinding costs were cut 50 per cent.

High-speed Steel — With this material, we often use two tempering cycles to break down as much of the hardening constituent as possible to increase cutting qualities. Multiple tempering with a chill to −120° F (after quench or first draw) proves better than multiple tempering alone. Developed martensite gives greater cutting efficiency. For most tools, chilling process follows the quench in oil, lead, salt or air—where quenching is arrested at about 150 to 200° F.

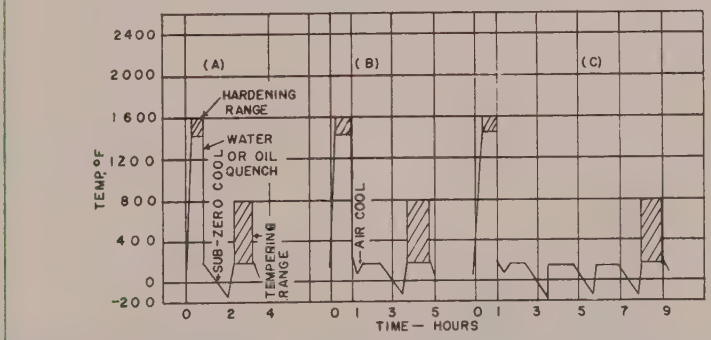
Keep tools at low temperature just long enough to get thorough heat removal. Then let them return to room temperature normally. From here they are transferred to the tempering furnace, which is at 1000 to 1100° F, depending upon hardness requirements.

Tools of intricate design (made of molybdenum, high-speed steel or conventional 18-4-1, high-speed steel) may have a tendency to crack during chilling. It is advisable to temper them at 1000 to 1100° F before chilling. Then they are given a second tempering and are ready for final grinding.

High Carbon — High-chrome steels, being highly alloyed, are sluggish in transformation and are well suited to sub-zero treatment. Materials are widely used for dies and cutters where high hardness and toughness are necessary. Austenite carried over from the quench gives unsatisfactory hardness. Low hardness values may range from 52 to 60 Rockwell C. Sub-zero chilling can improve hardness several points.

Austenite has the property of work hardening rather rapidly. It promotes the development of cracks during working by the action of the work material over the die. If a fully martensitic structure is obtained by chilling, cracking does not occur and longer die life results.

Many plants use a double temper with a subzero chill before each. One increased the life of a drawing die (used to form re-



Repeated cycles of chilling and tempering are used to transform all austenite. In general, cycle (a) is satisfactory for practically all alloy carburizing steels, tool steels, tungsten shock steels and others. If part is hardened throughout cross section, or if corners or edges are sharp, (b) and (c) offer little danger of cracking. The latter is especially good for gages

TYPICAL TREATMENT OF HIGH-SPEED AND MOLY STEELS

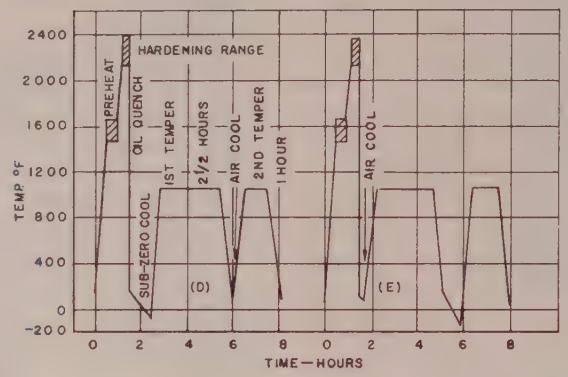


Chart (d) illustrates normal cycles. Chart (e) is used for large tools with complicated sections or corners or edges that are sharp. These tools should be tempered before they are given low-temperature treatment

frigerant compressor domes) 60 per cent. Another punched spring steel with high-carbon, high-chrome dies. Set of dies given a double chill and double temper produced 62,000 pieces a grind. Previous die life was 20,000 pieces a grind.

Normalizing — Subzero chilling of aluminum and magnesium castings contributes significantly to stress relief. Chilling before machining stabilizes castings and prevents warpage during or after machining.

A western aircraft company uses this procedure for the cold treatment of aluminum castings:

1. Heat part to 212° F—completely, uniformly.

2. Cool to just above room temperature by air or force cooling, being sure not to allow part to drop to room temperature.

3. Immerse in a chilling unit at −120° F until temperature is uniform throughout.

4. Warm part to starting temperature, not allowing it to remain at any one temperature.

5. Repeat cycle four more times.

Since elevated temperatures tend to destroy the effects of cold treatment, part is in its final heat-treated condition before chilling.

Same company uses this schedule to stabilize magnesium castings:

1. Heat part to 250° F in an oil bath—completely and uniformly.

2. Cool to just above room temperature by any slow but constant method. Do not allow part to reach room temperature or stabilize at one temperature.

3. Pre-chill at −100° F—completely, uniformly.

4. Soak at a minimum of −120° F (but not below −150° F) to get uniform cooling.

5. Slowly warm part to starting room temperature, not allowing it to remain at any one temperature.

6. Repeat cycle up to four times. Depending on shape and thickness of part, five total cycles are generally recommended.

Shrink Fits—For quick calculation, you can assume tool steel will shrink about 0.001 inch for each inch of diameter when chilled to −120° F. Bronze and brass give 50 per cent more shrinkage—or 0.0015 inch per inch of diameter. With aluminum and magnesium, shrinkage is about 0.002 inch per inch of diameter.

Utilizing this shrinkage speeds and simplifies parts assembly. Excessive or injurious heating of the female part is avoided. With chilling, as compared to heating, there is less possibility of altering the characteristics of the metal.

Chilling also offers less distortion of parts that have sections of different sizes. Chilled parts can be handled with greater ease than hot parts. And the hazard of oxidation (plus finishing it necessitates) is eliminated.

Cases—A jet engine manufacturer shrink fits 11 graduated spacer rings of aluminum and steel to a tapered compressor rotor wheel. Rings range from 20.5 to 25 inches. Old method of heating for expansion-fit assembly caused distortion and warpage.

A manufacturer of automatic screw machines chills bushings of bronze, cast iron, steel and Meehanite for shrink assembly. Generally, bushings are 0.002 to 0.0025-inch oversize. They are chilled to get 0.003-inch shrinkage, dropped into place and allowed to return to room temperature.

A tight, lasting fit is obtained. Fifty per cent saving in time and labor has been realized. Formerly, heat was used.

SHRINKAGE RATES FOR METALS AT −70 and −120° F

	−70° F.	−120° F.
Tool Steel	0.0016	0.0026
Phos. Bronze	0.0024	0.0036
Alum. Bronze	0.0024	0.0036
Brass	0.0028	0.0040
Aluminum	0.0034	0.0046
Magnesium	0.0034	0.0047

Table shows approximate shrinkage of rings on cylinders 2 inches in diameter. Other diameters shrink proportionately. For quick calculation, tool steel will shrink about 0.001 inch at −120°F for each inch of diameter; aluminum and magnesium, 0.0002 inch.

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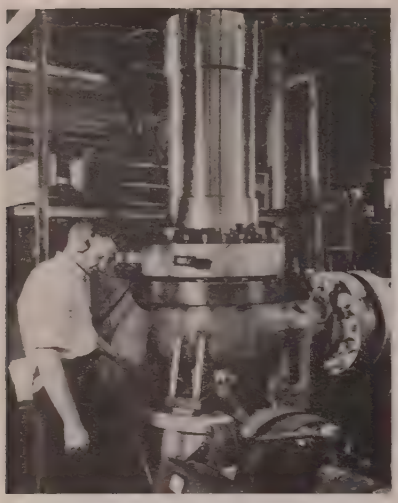
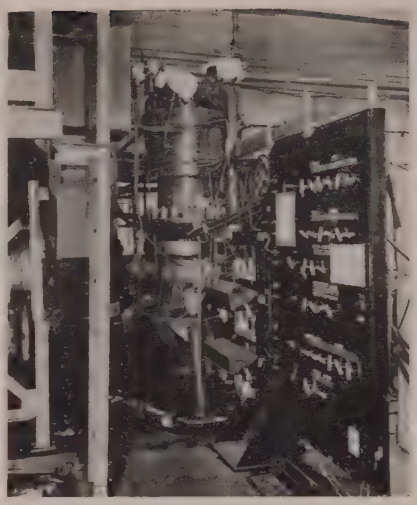


WESTINGHOUSE COOLANT PUMP
. . . operation in test loop



ALLIS-CHALMERS COOLANT PUMP
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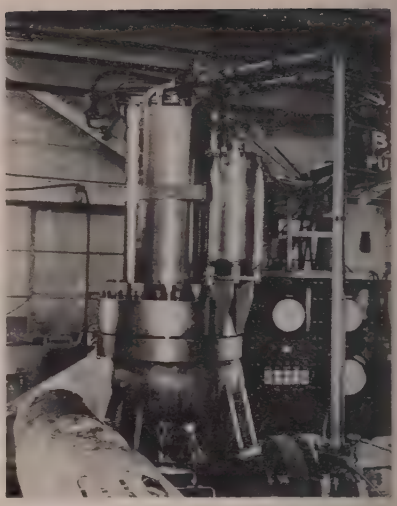

BYRON-JACKSON COOLANT PUMP
. . . test operation in rated system

Canned Pumps

Industry Does a Job for AEC

Now that design of the leakproof pumps developed for the Nautilus is declassified, Atomic Energy Commission opens the door to other industrial and research applications

ELECTRIC - MOTOR - DRIVEN pumps developed for the USS Nautilus' nuclear propulsion plant may lead to further industrial and research applications. Details of pump design, construction and operation have been made public by Atomic Energy Commission.

The so-called canned pump is absolutely leak-proof. Its application in the nuclear power plant is to pump primary coolant from the heat-generating reactor to the steam-generating heat exchanger and back again.

Inconel Jacket—Elimination of the seal on a canned pump is accomplished by encasing the pump and its electric drive in a single pressure-tight housing, made in two parts, bolted and welded together. When this is done, fluid being pumped has access to motor bearings, and conventional oil lubrication cannot be employed.

Lubrication is supplied by the pumped fluid. Thus, it is necessary to provide materials for the bearing and journal that have good bearing properties, are compatible with one another, are nongalling and corrosion resistant in the primary fluid.

To protect the electrical windings from attack by the hot fluid, the stator bore is lined with a cylinder of Inconel sheet, welded leaktight in place. Rotor is also canned, similarly for corrosion reasons.

Two Characteristics — Pumps with two sets of characteristics are required. Main coolant pumps each must circulate 4000 gpm of high temperature water under 2000 psi system pressure, with a developed head of about 100 psi. Hydraulic service pumps each deliver 150 gpm of the high pressure, high temperature primary water at a head of about 120 psi.

Operating time on existing units varies from as much as 18,000 hours on the smaller sizes to 5000 hours on the larger.

Three Contributors—Pump development was a project of Westinghouse Electric Corp. under AEC contract. Two other firms, Byron Jackson Pump Co. and Allis-Chalmers, are responsible for design variations on models of their own that meet AEC specifications.

AEC now is offering complete information, including plans and specifications, for other builders interested in securing subcontract work or for industrial adaptation of the design employed.

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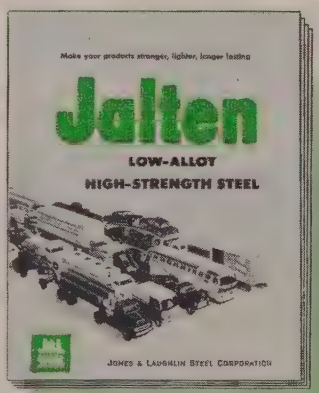

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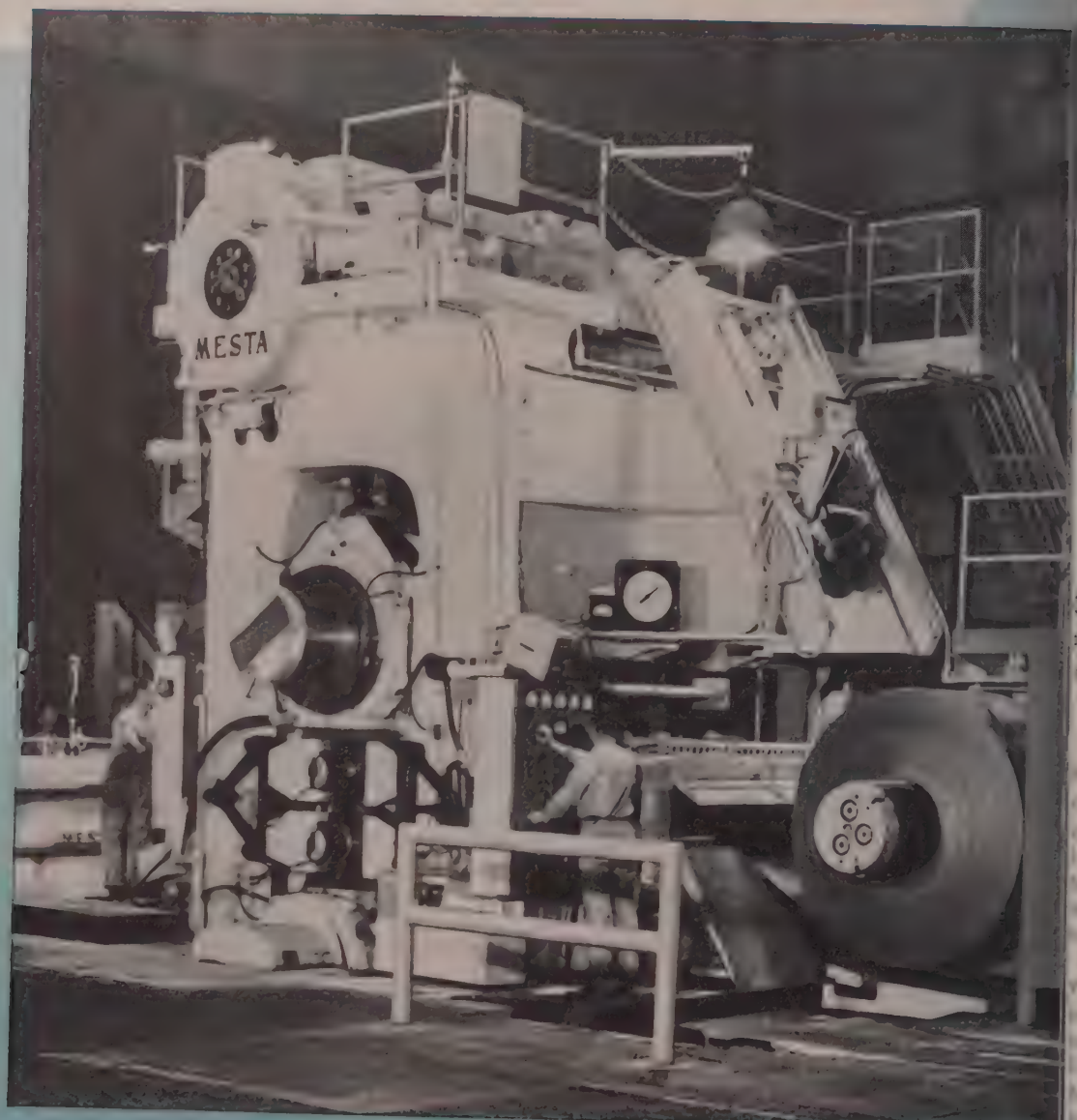

Mesta 80" Four-High, Single-Stand Sheet Temper Mill for Coils

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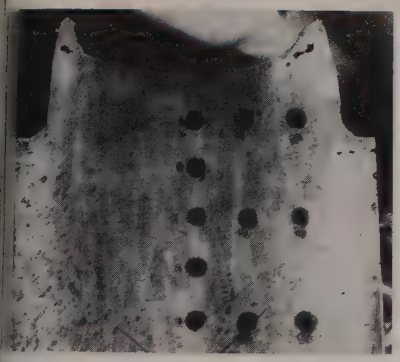


Fig. 1—Upper section of ingot showing sound metal above the neck

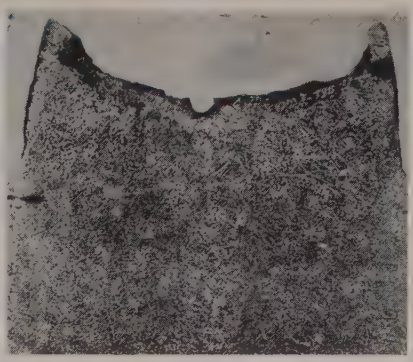


Fig. 2—Baumann test of ingot, shown in Fig. 1, details the neck structure

Fig. 3—Stainless steel ingot displays sound and homogeneous structure

New Exothermic Technique . . . For Pouring Ingots

Cast-iron hot tops lined with exothermic flat refractory plaques effect a reduction in feedhead and a 10 per cent increase in sound metal above ingot neck

By PIERRE VENARD
Civil Engineer of Mines
Marrel Brothers
Rive de Gier
France

STEELMAKERS long have been endeavoring to reduce the "feeding factor", (the weight of the feedhead to the total weight of the ingot ratio) in order to reduce production costs and increase furnace output.

In the case of ordinary steels in which segregation plays a minor part, this feeding factor can be reduced to a value ranging from 15 to 17 per cent. In the case of ingots for the manufacture of steel pipe, this proportion is commonly lowered to 10 per cent.

Alloys Higher—In the case of alloy or semialloy steels, where segregation has to be eliminated, the ratio must be as high as 18 to 25 per cent, depending upon the shape of the ingot or the grade of steel. This extra margin is due to the fact that a v-shaped shrink cavity or pipe corresponds to a v-shaped segregation that shows a well-marked tendency to extend down to the lower portion of the ingot.

A feeding factor as high as 25 to 100 per cent for feeder-heads has been adopted for special fabrications, like that of Swedish steel.

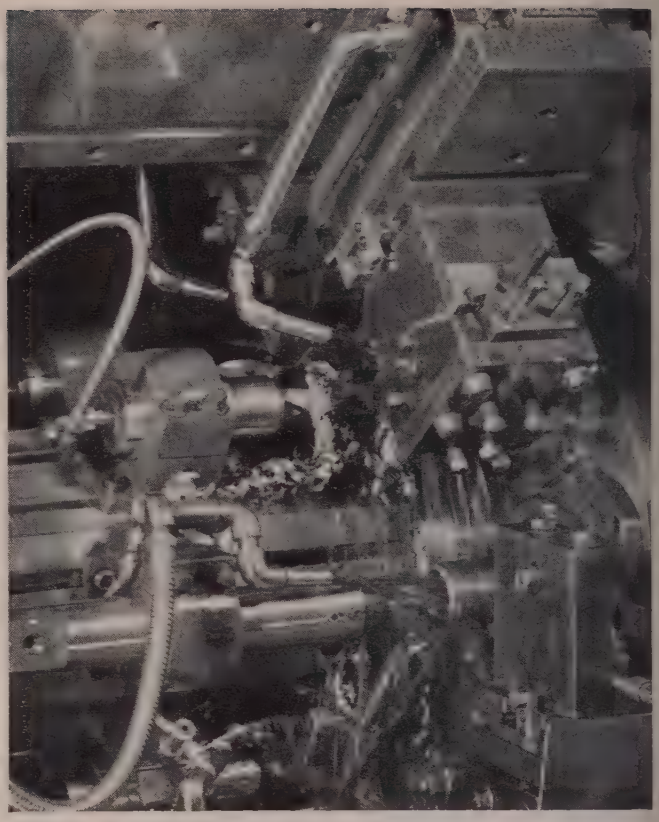
Possible Solutions—Recent investigations made by some American technicians have shown that when a feeder-head solidifies, about 70 per cent of the cooling occurs on the sidewalls and 20 per cent on the upper surface. This conclusion has led French steelmakers to consider two possible solutions: The heat insulation of the feeder-heads is obtained either with hollow bricks or with bricks made of insulation materials, or the feeder-heads are heated laterally. The second course has been chosen because heating materials are available that are only slightly different from the so-called exothermic antishrinkage powders. Some good results have already been obtained with them in French iron and steel foundries.

Four Phases—The problem of feeding steel ingots exothermically involved four phases. All this development work was done in cooperation with the Doittau group operating under a lessee agreement from Soffel's Pittsburgh Metals Purifying Co.

The first phase, involving compounding of the mixture, was easily solved. The material should be sufficiently reactive to ignite before a solid skin may form against the walls. Its reactivity should not be too great, as the product should not enter into reaction until the metal flows into the heads, and it should be permeable enough to allow the calories to go freely inwards and the combustion gases to escape outwards. A product called Exothermol has been developed which has the advantage of giving no inconvenient flash while the metal is being poured.

Second Phase—The study of the second phase was, in fact, but a check on the theoretical calculations based on the so-called "modulus of cooling". Theory and prac-

MACHINABILITY HERE... *plus*



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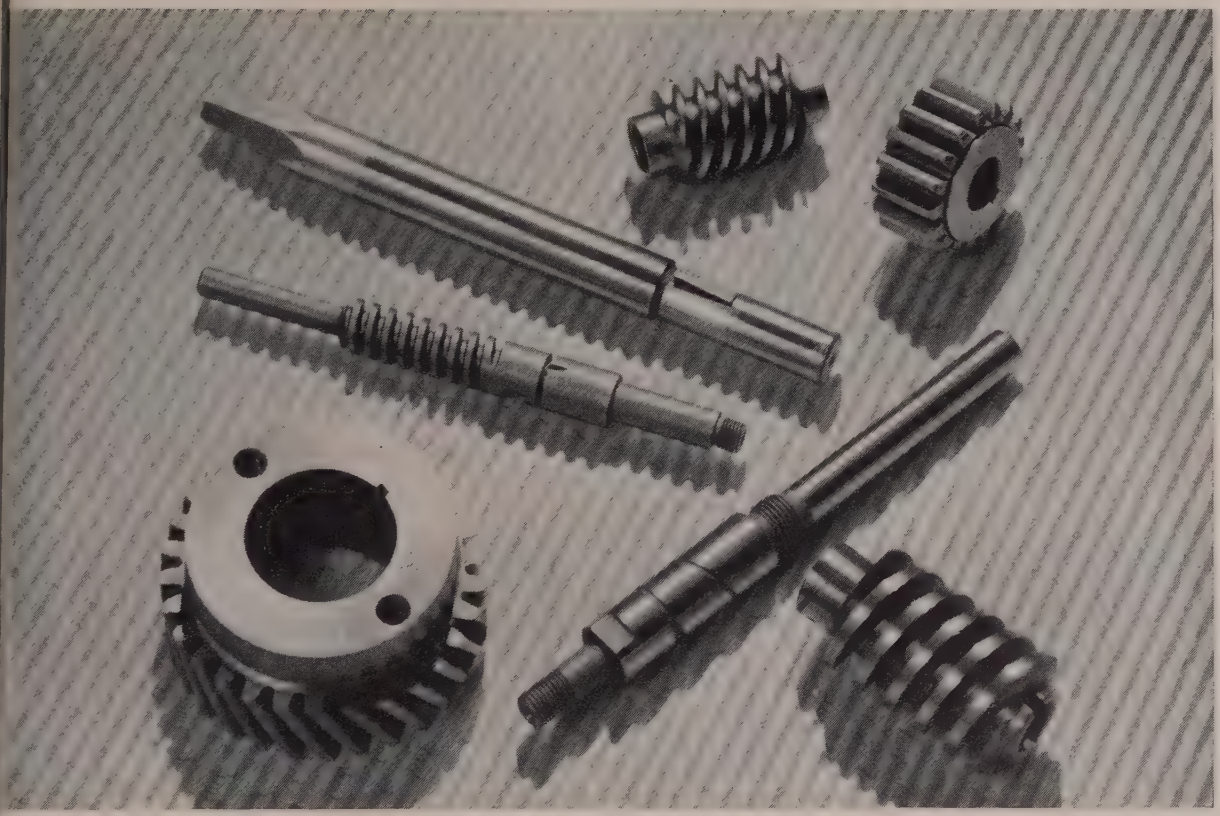

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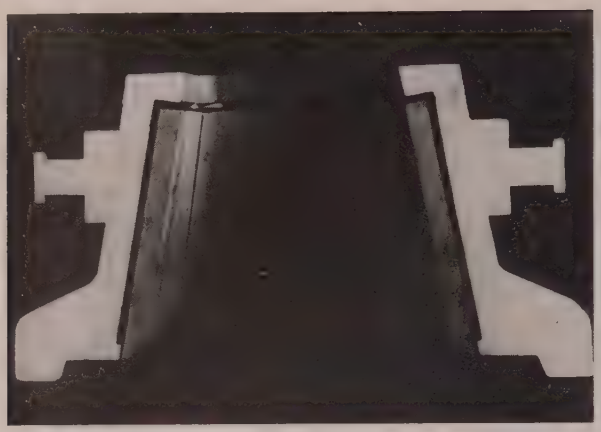


Fig. 4—Flask cross section shows flat refractory plaques

Fig. 5—Size comparison of feeder heads using flasks

tice were in almost perfect agreement. Inasmuch as the thickness of the lining depends upon the section of the ingot, it is easy, by extrapolation, to change over from one type of ingot to another.

Phase Three—The problem relating to the determination of the level at which the metal should be poured in the head can be solved in several ways, according to the aim in view, and also the theoretical or practical solution.

The theoretical solution consists in making use of the most economical shape for the lining, i.e. cylindrical and as narrow as possible. With such designs feeding factors from 3 to 5 per cent could be obtained. For practical reasons, however, these advantageous solutions had to be discarded.

Shaped Lining Is Adjustable—The most efficient feeding technique, so far as the soundness of the ingot at the neck is concerned, involves the use of a lining in the shape of a frustum of a square-based pyramid that can be adjusted on the ingot with a recess reduced to a minimum. This design has the disadvantage of increasing the so-called feeding factor, as compared with a cylindrical lining.

The proper design having been determined, the level at which the sinkhead is to be filled is easily determined by considering the viewpoint of the user who tries only to eliminate pipes as well as all traces of segregation and retain a safety margin. The latter consideration was the guide in calculating the feeding factor to be applied to the typical ingot.

The Proof—This bottom-poured ingot, with its larger base on the top, had a 518-pound feeder-head for an aggregate weight of 2813 pounds, i.e. a feeding factor of about 18.5 per cent. The new exothermic feeding technique permitted a reduction in the weight of the head to 187 pounds for a total weight of 2480 pounds, i.e. 7.55 per cent, with a 3.15-inch height of sound metal above the neck. Fig. 1 represents an ingot of this type.

Soundness of the metal below the head and the compactness of the latter were tested on many ingots in the following manner:

1. Head was sawed off at the neck; soundness of section was tested and macrographic study made.
2. Vertical section of the ingot—section passing through centerline of ingot in a parallel direction to sides.
3. Ingot was sawed along same plane, leaving 1½ to 2-inch strip untouched on the centerline. Ingot is then broken under a press and fracture examined. Upper part (close to neck) is polished to permit macrographic study. Cuttings are taken for segregation tests. Quantitative analysis is made to determine main components, including aluminum.
4. Ingot was sawed in slices, perpendicularly to its centerline, and compactness of the metal tested.

Results Are Uniform — These researches have shown that the soundness of the metal is in no way impaired by exothermic heating and that uniform results are achieved, whatever the composition of the steel.

Fig. 2 illustrates a Baumann test of the ingot top shown in Fig. 1. The defect that can be seen in the left hand top-corner is due to a "lap" in the metal. The homogeneity is normal; no aluminum pickup or segregation of P, Si, Mn, Cr, Ni and Mo was noticed.

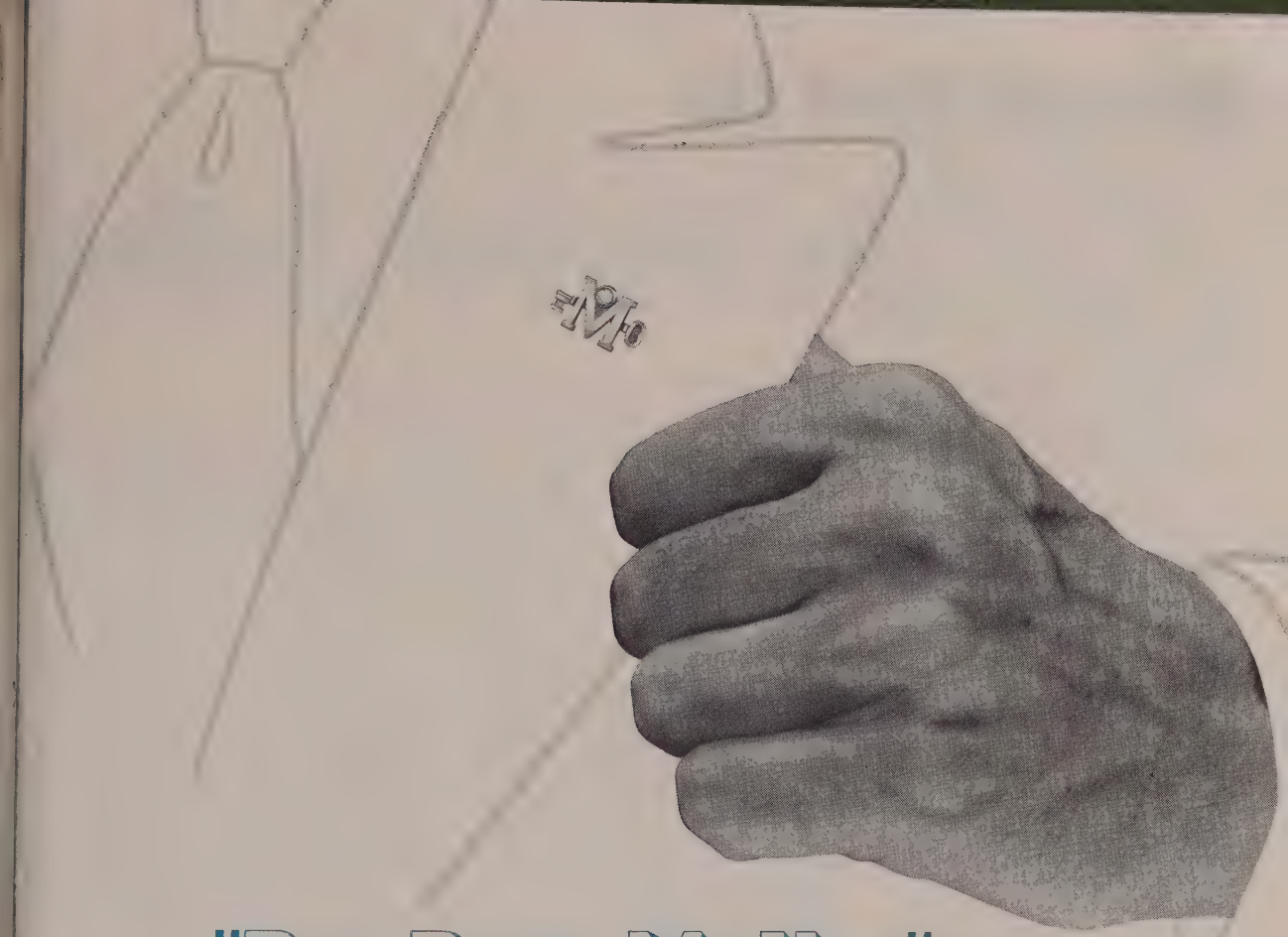
The Question — Can favorable results so far as segregation is concerned, be obtained with a smaller feeding factor and can ingots weighing 2414 pounds with a 5 per cent factor be cast?

In such a case, it is generally advisable to crop the top of the ingot a little more than usual, even though the pipe does not extend down to the body of the ingot. Fig. 3 shows half of a stainless steel ingot of this type. It will be seen that, in this particular case, where the solidification factors all tended in a favorable direction, the body of the ingot is perfectly sound and homogeneous.

Conclusion covering ordinary and stainless steels include: (1) A sound ingot, showing no traces of segregation and shrink cavities, can be produced with a 7.5 per cent feeding factor, and (2) all pipe cavities in the body of the ingot are eliminated with a 5 per cent factor.

Operation is Avoided — Ramming the green materials in the

(*Please turn to page* 122)



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How to Tool Up for Aluminum Cutting

If your tool shapes are right, you usually can cut aluminum at top speeds and feeds of the machine. Here are some experts' tips on how to tool up for the job

By RALPH WOHLFORTH *Plant Engineer* AND WALTER BLOSS *Senior Engineer*
Kaiser Aluminum & Chemical Corp.
Newark, O.

CUTTING SPEED in machining aluminum can be maximum efficient speed of the machine. Type of tool has a direct bearing on permissible speeds. Cemented carbide can be used at higher speed than high-carbon and high-speed steel tools.

Cut depths range from ¼ inch on radius of the workpiece in roughing cuts to 0.020 inch in finishing cuts. To prevent rubbing of the tool, light finishing cut should not be below 0.020 inch.

Feed per revolution and per tooth engagement of milling cutters ranges from 0.005 to 0.050 inch. For cemented carbide tools. feeds and depths of cut are about one half those of high carbon and high speed steel.

HEAT TREATABLE WROUGHT ALUMINUM ALLOYS

11S* 17S* 24S* 14S* 75S* 61S*
18S 63S

NON-HEAT TREATABLE WROUGHT ALUMINUM ALLOYS

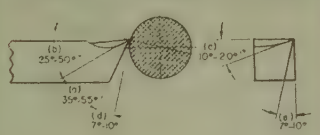
52S* 2S*
EC 3S 4S 50S 56S

Cemented carbide is particularly recommended for high-silicon alloys.

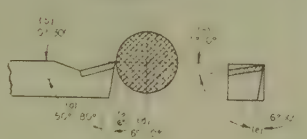
Aluminum alloys can be separated into two general classifications: Heat treatable (strong) and the non-heat treatable (common) alloys. Alloys designated by the asterisk are available as screw machine stock or as rolled or cold finished rod or bar.

TURNING TOOLS
High Carbon or High Speed Tools
Carbide Cutting Tools

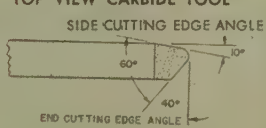
STANDARD RECTANGULAR TOOL SHAPE



CARBIDE TOOL



TOP VIEW CARBIDE TOOL



Generally, heat treatable alloys will require more rugged tooling than the non-heat treatable group.

Angle (a) Cutting angle should be in the top range for heat-treatable and high-silicon alloys to provide strength in the tool. Cutting angle should be in the low range for non-heat-treatable alloys—strength determines practical low limit.

Angle (b) Back rake angle can be increased by raising the tool above the centerline of the work. This prevents tool from feeding itself into the workpiece. As stock size decreases, a smaller back rake angle gives equal chip breaking action. Generally, lower top and side rakes produce tighter curls, which help to break continuous chips.

Angle (c) Side rake angle controls direction of chip flow. Alloys making continuous turnings would indicate higher side rakes to keep tool post clear.

Angle (d) Front clearance, measured from tangent to workpiece at the tool contact point, is reduced by raising tool above the centerline.

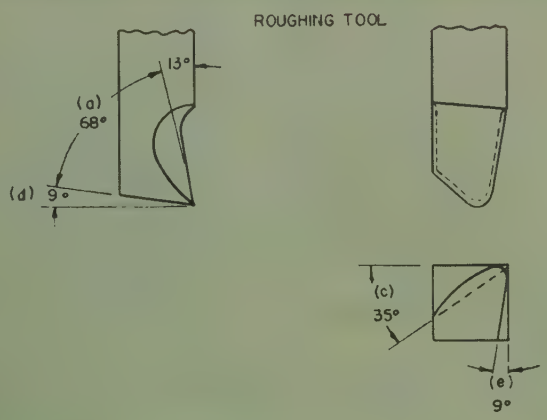
Angle (e) Side clearance angle is usually equal to effective front clearance. This angle reduces build-up by preventing workpiece rubbing on the tool flank. When using coarse feeds, reduce this angle.

TURNING TOOLS

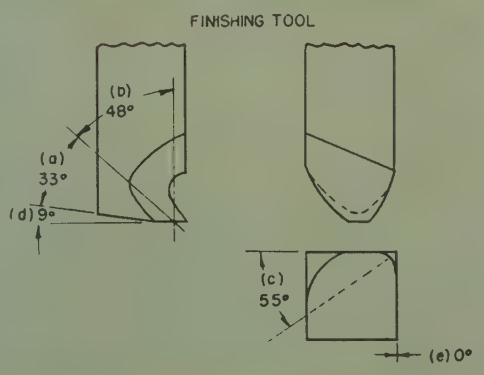
Tool Material	A Cutting Angle	B Back Rake	C Side Rake	D Front Clearance	E Side Clearance
High Carbon ..	35°-55°	25°-50°	10°-20°	7°-10°	7°-10°
High Speed ...	35°-55°	25°-50°	10°-20°	7°-10°	7°-10°
Cemented Carbide	50°-80°	0°-30°	5°-10°	6°-10°	6°-10°

When grinding a tool for a facing operation, interchange back and side rack values.

PLANING AND SHAPING TOOLS

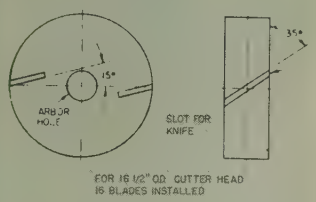


Angle (a) Cutting angle	64-72 degrees
Angle (b) Back rake angle	10-20 degrees
Angle (c) Side rake angle	30-40 degrees
Angle (d) Front clearance angle	8-20 degrees
Angle (e) Side clearance angle	8-10 degrees

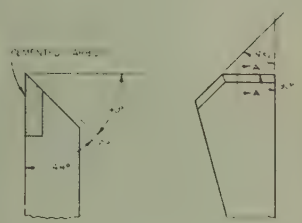


Angle (a) Cutting angle	30-36 degrees
Angle (b) Back rake angle	45-51 degrees
Angle (c) Side rake angle	50-60 degrees
Angle (d) Front clearance angle	8-10 degrees
Angle (e) Side clearance angle	0 degrees

CUTTER HEAD

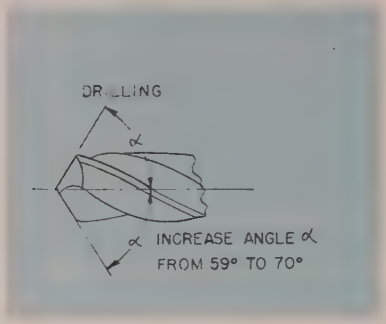


BLADE



MILLING TOOLS

Milling of aluminum can be done at top speed of the equipment if the machine is vibration-free and has sufficient power. Cutters (see head and blade drawings above) should be coarse-tooth spiral type with larger top rake than is used for steel. Otherwise, tooth angles generally follow trend for single-point tools which were discussed previously. Use high spindle speeds and low feeds to provide short chips.



OPERATION	COOLANT RECOMMENDED
Turning Rough Turning	Light Mineral Oil Mineral oil plus 10% lard oil Commercial compounds
Finish Turning	Soluble oil 10 to 20%, remainder water Kerosene thinned with lard oil Water with 1 to 2% alkali such as borax, or sodium carbonate Commercial compounds
Milling	Soluble oil 6 to 10%, for high speeds Soluble oil 3 to 4%, for low speeds Mineral oil Mineral seal oil Commercial compounds (consult manufacturer)
Reaming	Pure lard oil, or lard oil and paraffin Soluble oil (for carbide tools)
Tapping	Lard oil Sperm oil Wool grease Grease White lead (for hand tapping)
Drilling	10% lard oil, 90% mineral oil Soluble oil, 15 to 30% Kerosene and lard oil
Planing and Shaping	Commercial compounds (consult manufacturer) Soluble oil Light mineral oil
Sawing	Soluble oil, 5 to 10 % Soluble oil with kerosene or lard oil added Grease stick (for band saws especially) Lubricating oil thinned with kerosene Commercial compounds (consult manufacturer)
Grinding	Soluble oil 2 to 3%

DRILLING

Drill point should have an included angle of 140 degrees. Helix angle should be 45 degrees. Speeds for drilling should be the top speed of the machine. Feeds can be heavy, increasing as the diameter of the drill increases. Clearance angles of the lip should be large (up to 20 degrees) for heavy feeds. On harder alloys, clearance should be reduced to 12-15 degrees, and lower feeds should be used. Slower twist is recommended for drilling thin stock. Drill grooves should be highly polished to facilitate chip travel.

GRINDING

Various alloys differ considerably in grinding characteristics. Harder free machining alloys can be easily rough and finish ground. Softer alloys tend to clog the wheel and do not finish so well. Grinding wheel manufacturer should be consulted for specific recommendations for any given job.

TAPPING

Taps should be ground with deep, wide flutes. Top rake should be 10 to 20 degrees. Flutes should be polished. In the softer alloys a spiral-fluted tap is preferable. Gun taps should be used for through holes. Backs of the lands should be radial, to slightly undercut, to provide for backing out without tearing the threads. On softer alloys it is often advisable to use an oversize tap which will eliminate tight running threads.

REAMING

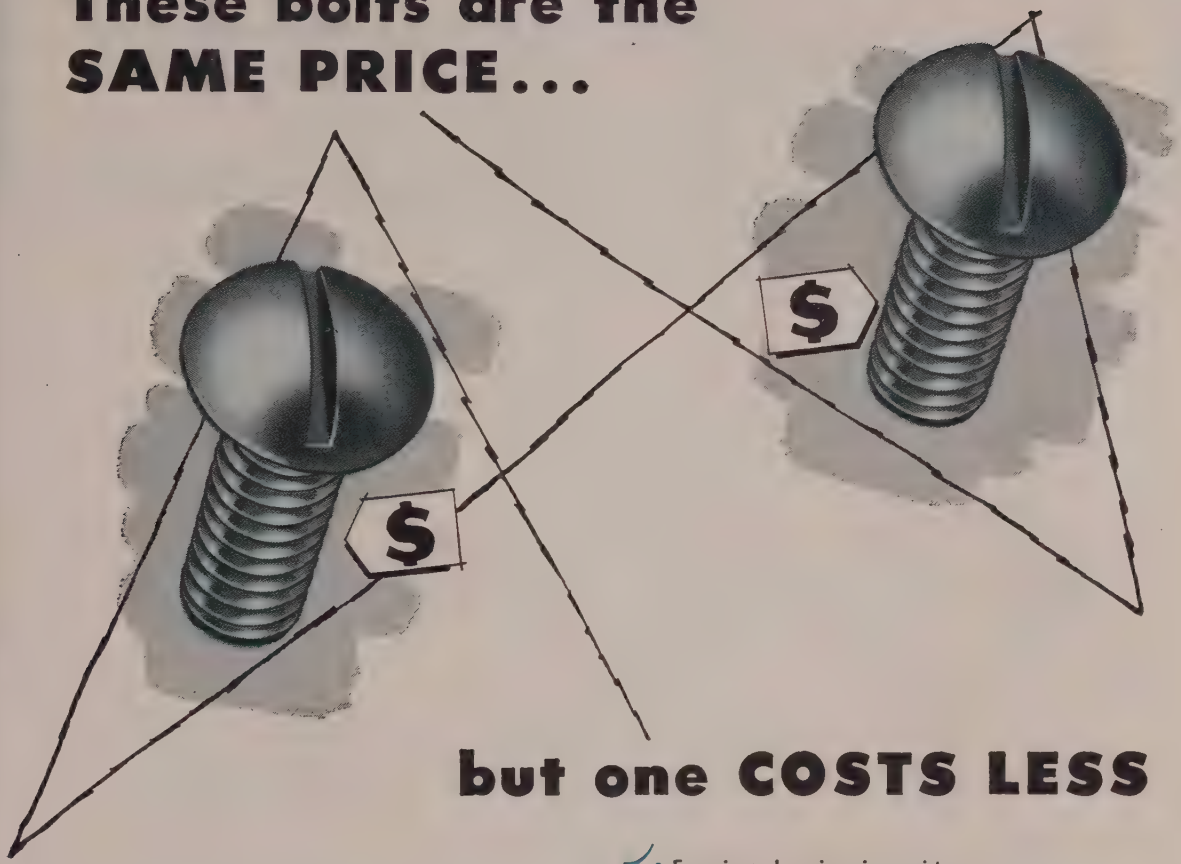
Reamer blades should have a positive rake of from 5 to 10 degrees, a land of .020 to 0.060 inch ground with relief of about 5 degrees blending into clearance of about 15 degrees. Reamers should be spiral fluted. Holes to be reamed should be .010 to 0.020 inch undersize to provide for positive reamer cut.

SAWING

Top rake of saw tooth is large, up to 45 degrees. Cutting angle should be kept small. Bottom clearance is 8 to 10 degrees. Side clearance should be maintained to prevent rubbing of the blade against the work. Cemented carbide teeth have rake angles of 5 to 10 degrees with bottom tooth clearance 5 to 10 degrees.

Circular saws with alternate teeth should be used. Band saws are of heavy-duty, wood-working type. Relatively coarse teeth are preferred, 4 to 14 teeth per inch. Choice is dictated by the section dimensions to be sawed, a thin piece requiring more teeth than a thick one.

These bolts are the SAME PRICE...



but one COSTS LESS

Granted that the price tag is the same on two bolts; how can one cost less?

The answer is obvious because no price tag tells the story behind the product. It doesn't show you the extra values that are as important as the price on the tag. By this reasoning, if you get *extra* value the product has, in effect, cost you less.

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Ideal for blind or hard-to-reach places.

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CAP SCREWS
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SQUARE AND HEX MACHINE SCREW NUTS
Also semi-finished, hot pressed and cold punched nuts.

LOCK NUTS
Economical, vibration proof. Can be used repeatedly.

COTTER PINS
Steel, brass, aluminum and stainless steel.

"1035" SET SCREWS
Cup point type, hardened and heat-treated.

DO YOU KNOW WHAT HEAT TREATING COSTS
When You Do Your Own?

If you now do your own heat treating—or are contemplating the installation of a heat treating department—have you carefully considered all of the costs involved? Each of the following factors must be given careful consideration:

LABOR

Trained operators require years of experience, without them you cannot expect satisfactory heat treating. Can you afford men of this caliber for the amount of heat treating you require?

MAINTENANCE

Equipment must be kept in constant repair to prevent rapid deterioration. What does it cost you or what will it cost you?

SUPPLIES

Gas, electricity, chemicals—an endless variety of materials are needed continually. Are you wasting money due to insufficient work to keep all equipment going? Closing down and re-heating furnaces is an expensive waste.

TESTING EQUIPMENT

A constant check on heat treating operations and results is required to maintain quality and uniformity. Add this to the cost of your equipment along with skilled operators.

PLANT SPACE

Does your present department have enough space to work efficiently? If planning a new department, will it require an addition to your plant?

INSURANCE

What has the installation of a heat treating department done to your insurance rates? What can you expect if you are planning a new department?

EQUIPMENT

Can you economically install sufficient equipment to handle all of your requirements for hardening, annealing, carburizing, nitriding, etc., or can your present equipment handle all these operations with successful results? Is your capacity flexible enough to handle peak loads?

These are the major items to be figured into the cost of your own heat treating department—there are others which arise in special cases.

The problems listed here have been faced and overcome by commercial heat treaters. They know the answers because heat treating is their business—just as the manufacture of your products consists of solving numerous problems in your business.

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Carbide Grade Announced

New carbide grade for light roughing and general finishing on steel is announced by Carboloy Dept., General Electric Co., Detroit. It is the second grade in the new 300 series which produced heavy-duty grade 370 several months ago.

In effect, the new material extends the machining range of the new series to withstand cutting temperatures as high as 1800° F.

New carbide combines properties of high wear-resistance and extreme toughness. Field tests show gains of as much as 6 to 1 in tool life in some cases. One job, machining an axle shaft, benefited by a one-third increase in number of units per grind.

On some of the tougher machining jobs, like the machining of shell forgings, a modified 1045 steel, where steel came from the supplier in scaly and out-of-round condition, the new grade shows increases of 20 to 30 per cent.

Machining Transmission Cases

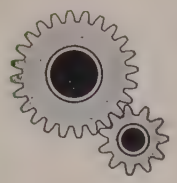
An automatic production line of four transfer machines has been designed and built by Greenlee Bros. & Co. for machining automotive transmission cases.

All four transfer machines combine the facilities of 247 tools to complete 265 operations in 29.5 seconds, averaging 122 cases per hour at 100 per cent efficiency.

Outstanding features of these machines are the safety devices for the protection of operating personnel and the machine. Steel mesh guards are provided on and between each working station and are hinged to allow easy access to the transmission cases for inspection and removal.

Guards are electrically interlocked, permitting the machine to run only when all the guards are locked down. Easy-to-reach emergency cords stop the machine from any position along its entire line.

All functions are hydraulically operated and electrically interlocked. Any defect is detected readily and trouble located immediately by a system of lights mounted on the operator's control panel.



MACHINE TOPICS

By R. F. HUBER, *Machine Tool Editor*

NEW RUMBLE in the special machine tool business concerns itself with a subtle shift in the type of equipment being entered on the order boards.

Several of the special-machine builders have reported that orders for the giant, spectacular transfer lines have dropped off, at least for the present. Most orders coming in are for the relatively small, relatively standard, relatively inexpensive index-table, trunnion, center-column machines and others of their general class.

The Pitch—Big reason for this shift seems to be that the market for transfer lines has been temporarily filled. Most of the automotive companies —biggest consumer of transfer stuff—have their lines ordered, delivered, and, in most cases, in operation.

One of the big three auto builders is said to have told its engineers to go with the lines now in place, implying: "We've got the lines we wanted; now let's settle down and use them."

One builder of specials points out that for the first quarter of 1953, two machines accounted for $1.5 million of a $2 million total sales volume. This year, in the first quarter, there are 20 units represented in a total $1.8 million order volume.

Next in Line — While the auto builders have led the way in the purchase and use of transfer lines, and still give a big piece of business to the specials, next in line comes the appliance makers. They're already using, buying or at least looking at, transfer methods of production.

Sales Slip

Machine tool orders in April came to about $42 million, compared with $50 million in March. Backlog for the industry is reported at about 4.1 months. That compares with 4.6 months at the end of March.

Interesting note on the backlog situation is that there is no pattern. Some machines can be shipped from stock. Some have an 18-month backlog. The time lag apparently has no relation to type or size of machine, the price or anything else.

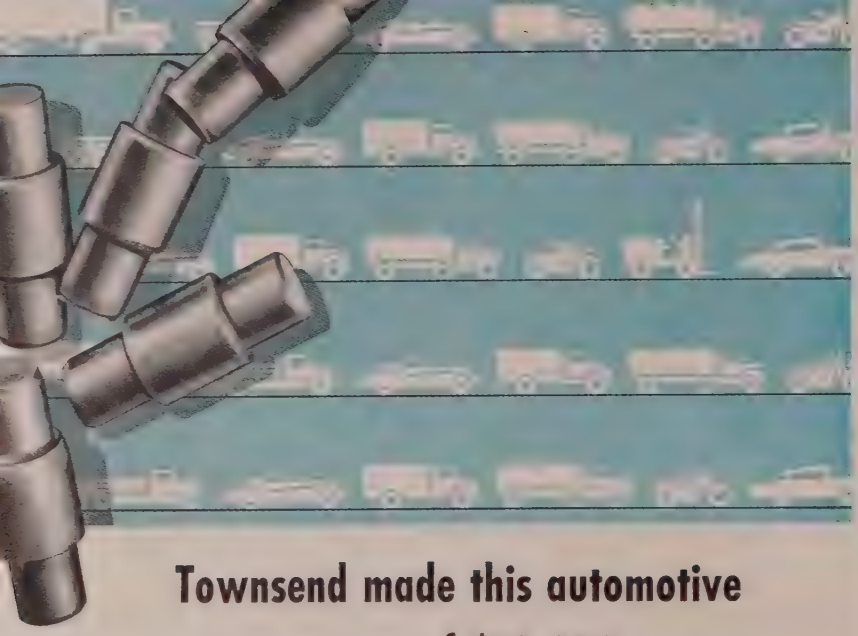
Sales School

The 1954 Machine Tool Sales Conference is set for Cornell University, July 12 to 16. It's again sponsored jointly by the National Machine Tool Builders' Association and the American Machine Tool Distributors' Association. Sessions are open to employees of members of both associations.

B & S LOOKS AHEAD

In a letter to stockholders, President Henry D. Sharpe Jr., of Brown & Sharpe, discloses the company directors have approved an initial capital appropriation of about $2 million for modernization and re-tooling of the company's screw machine facilities at Providence. Figure covers capital expenditures only and doesn't include an estimated $3 million for other development costs.

Bulk of the money will be used for improvement of machinery. Succeeding phases of the plan envision further remodeling of the layout.



Townsend made this automotive part at a savings of $18,000 per year

Big savings turn up in unexpected places when you examine the cost of producing small parts and fasteners. That's what happened when a Townsend engineer suggested that this small spacer stud could be produced by the Townsend method of cold-forming at one-third the cost of the former method. Result —a cool $18,000 clipped from production costs and a tougher, stronger part.

This is possible because the Townsend method is fast. And all the raw material went into the part, none was cut away as scrap. As a result, more pieces per pound of metal were produced, resulting in additional economy.

Townsend parts have high resistance to shock and fatigue because cold-forming increases tensile strength. The flow lines of the metal follow the contours of the piece instead of remaining in a single plane, as with machined parts. Cold-forming strengthens the threads and eliminates stock notching. Close size tolerances and excellent surface finish are characteristic of Townsend parts.

As "The Fastening Authority," Townsend produces 60-million pieces daily—regularly makes more than 10,000 special and standard fasteners and parts. With this capacity and the experience of 138 years of metal working to draw upon, Townsend engineers will help you reduce your material and assembly costs. Ask to have one of them call. For more information use the coupon below or write for illustrated bulletin.

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(*Continued from page* 114)

sinkhead is to be ruled out in full scale operation. The Doittau group has created and developed a patented setting that has already been used successfully to produce a large tonnage of steel.

Fig. 4 is a cross-section of the flask used for this purpose and lined with exothermic flat refractory slabs called plaques. The insulating air sheet is shown between the plaques and the iron flask, as well as the ribs supporting the plaque. This heat-insulating air space allows the combustion gases to escape.

Easy To Make — The refractory plaques are of simple design, and can be mass-produced with a press; they are also easily baked. then stored in boxes of trapezoidal cross-section. Less than two minutes is required to assemble them in the flasks. They are held in position with refractory cement, without any use of mechanical devices.

When they have served their purpose, the burnt-out plaques are easily broken by knocking them a few times with tongs.

The two feeder-heads are shown in Fig. 5, one weighing 154 pounds (left) and the other 485 pounds. About 33 pounds should be added to these weights to allow for sawing.

Relined After Each Pour—As the sinkheads are relined after every operation, the volume of the feeder head is always uniform, the ingots do not adhere to the sinkheads, which means fewer cracks, time is saved during stripping operations, and savings are made on flask maintenance. In one year's operation, no wear, tear, or breakage occurred in stripping operations.

Reduction of the feeding factor resulted in a 10 per cent increase of the quantity of metal available for conversion, a decrease in the heating costs at the mills, a slight decrease in rolling time and a consequent increase of production.

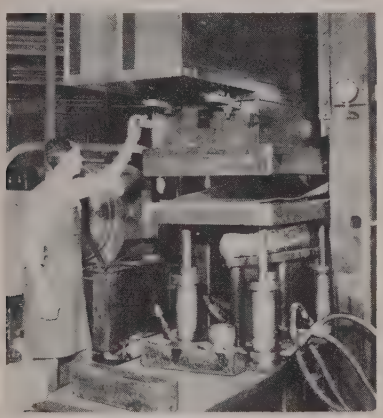
The amount of exothermic products to be used depends on the shape of the ingot. A slender ingot will require a smaller quantity of exothermic materials than a thick, heavy one.

Life for Old Machines

Pastushin reworked a Verson press to deep draw sheets up to 14 feet in length

HOW IMAGINATION and ingenuity can be combined to give old machines new life was demonstrated recently by Pastushin Aviation Corp., Los Angeles. The company reworked a Verson hydraulic forging press as part of a continuing program to increase machine tool utilization.

The press originally was designed to forge artillery shells in World War II: never was intended to form sheet metal. Pastushin tooling engineers decided to rebuild the press to permit deep-drawing of sheet metal parts up to 14 feet in length for deep-drawing

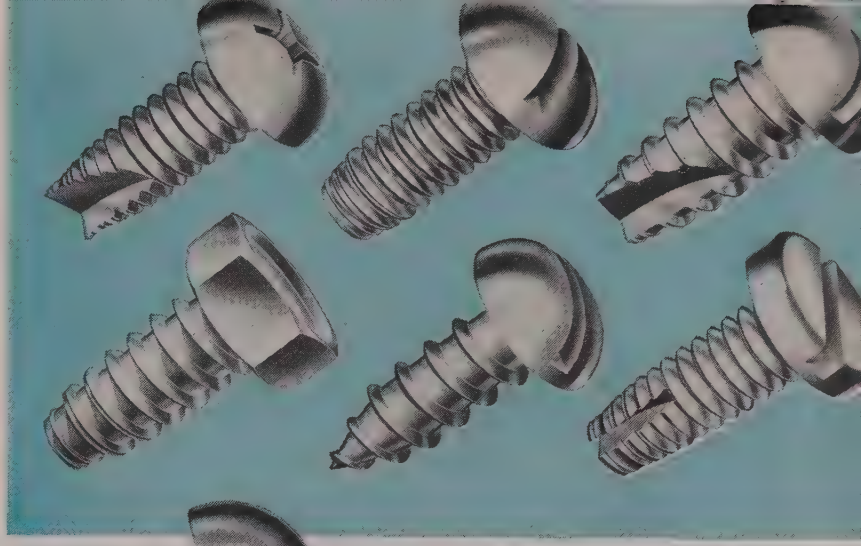


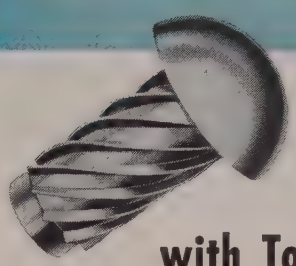
REWORKED PRESS
. . . ram descends on sheet blank

jettisonable fuel tank nose halves, 25 inches OD and 80 inches long. To accomplish this, the engineers were faced with major renovating problems.

Alterations—They increased bed size from 36 x 30 inches to 36 inches by 14 feet, by adding special over-hanging bolsters 14 feet long with 5½ foot overhang. To reduce the press' 92-inch shut height, the bolsters were fabricated 36 inches deep, reducing the shut height to 20 inches and the stroke to 66 inches, ample for sheet metal draw-die operations.

Skin Extended — Designing the draw-die was the next problem confronting the engineers. Since the distance between the press side housing was 8 inches less than the necessary width of the blank, the





You Get Economical, Quick, Secure Fastening with Townsend Tapping Screws

You enjoy the economy of quality when you use Townsend tapping screws. They are made to provide an easy method of securely fastening metal, plastics, wood, asbestos and compositions with efficiency.

The use of Townsend thread forming screws eliminates costly tapping operations as the precision-rolled thread forms a mating thread when the screw is driven into the material. They are widely used in sheet metal, castings, and a variety of non-metallic materials. They may be removed and replaced without impairment of their holding power.

Townsend thread cutting screws have an off-center slot which presents a true, sharp, thread-cutting face which acts as a tap when the screw is driven into an untapped hole. By cutting their own threads, these screws fit tightly and resist loosening from vibration. There is no chance of size discrepancy between screw and tapped hole.

Townsend tapping screws are available in the types shown here in a variety of head styles with slotted or Phillips recessed and hex heads. They are but one group of the Townsend family of 10,000 types of standard and special fasteners and small parts used by all industry to improve assembly and speed production.

As representatives of "The Fastening Authority" Townsend engineers can draw upon 138 years of accumulated experience in wire drawing and cold forming to help solve your fastening problems. You can depend upon Townsend to give you excellent service in any quantity. For additional information on the economy of using Townsend tapping screws, send the coupon below or write.

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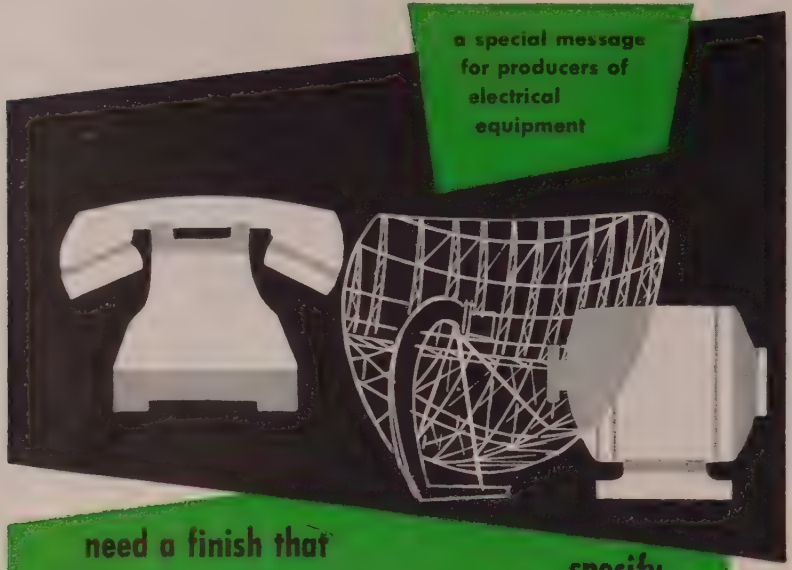

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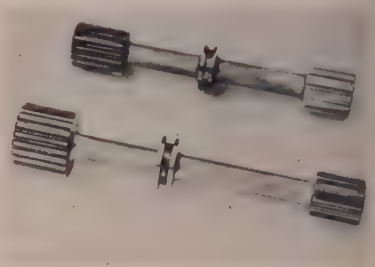
die was designed to allow the skin to extend beyond the clamping surfaces of the pressure plate and draw ring. To permit insertion of the blank into the press 8 inches narrower than the blank width, the blank was flanged to allow vertical flow in the clearance between the die and the side housing before entering the draw plate.

Though only 250-ton capacity, the original press had a high-volume, high-pressure 150-hp pump which created speed in excess of their requirement. The hydraulic system was analyzed and modified to reduce the press speed and increase tonnage from 250 to 300 tons.

Stainless Chases Fatigue

AIRCRAFT PUMP SHAFTS are subject to quickly-changing loads, plus rapid acceleration and deceleration. On one application, original specification called for fabrication from 4140 steel and failure due to fatigue occurred after a comparatively short time.

Experimentation—Denison Engineering Co. tried out 440-C stainless steel and beryllium copper



STAINLESS PUMP SHAFTS
. . . exceeded 10 million reversals

with no better results. They finally solved the fatigue problem with Armco 17-4 PH (precipitation-hardening) stainless steel.

Under test conditions, the 4140 steel lasted less than 1 hour, beryllium copper about 9 hours, while 17-4 PH stainless steel went 30 hours before failure. It exceeded the usual limit of 10 million reversals established for testing fatigue.

Ease of machining and hardening were other advantages of the 17-4 PH material, according to Denison engineers.

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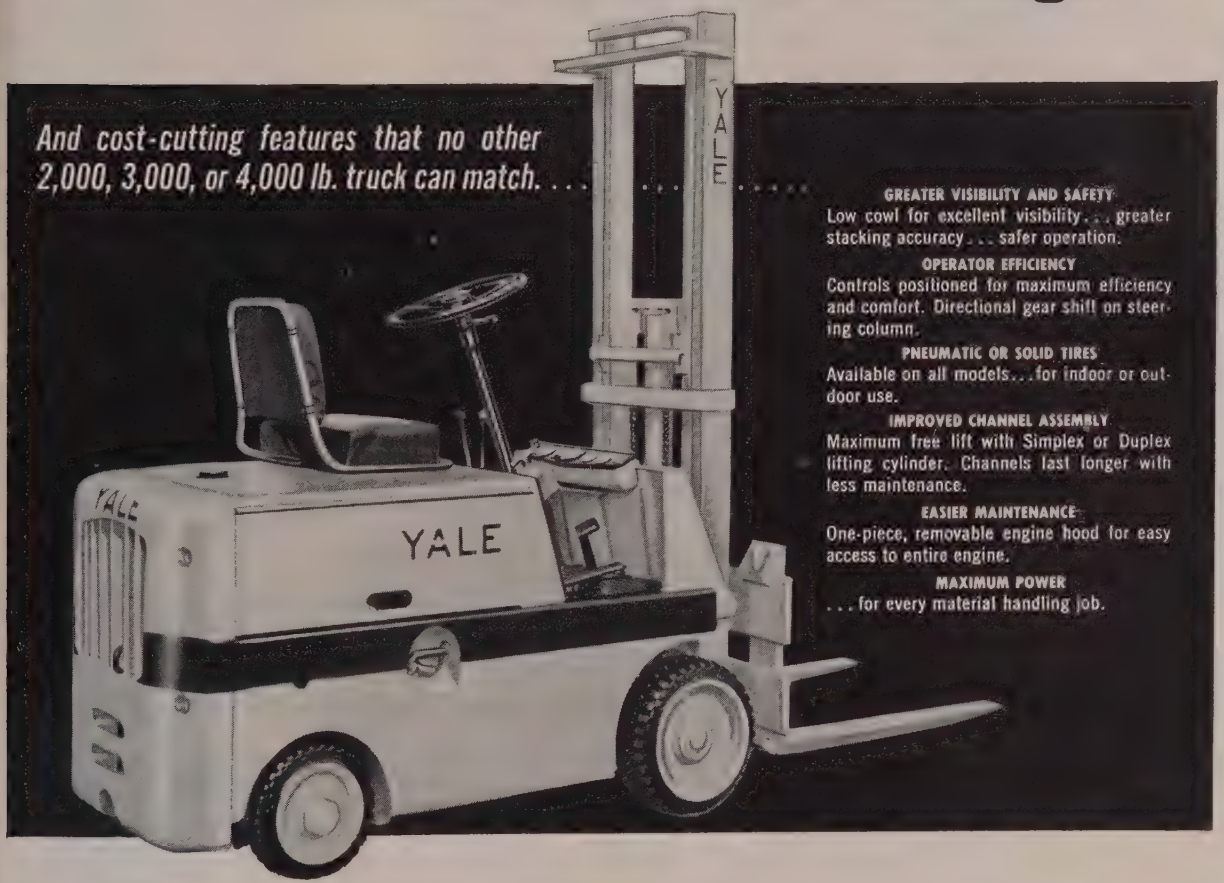
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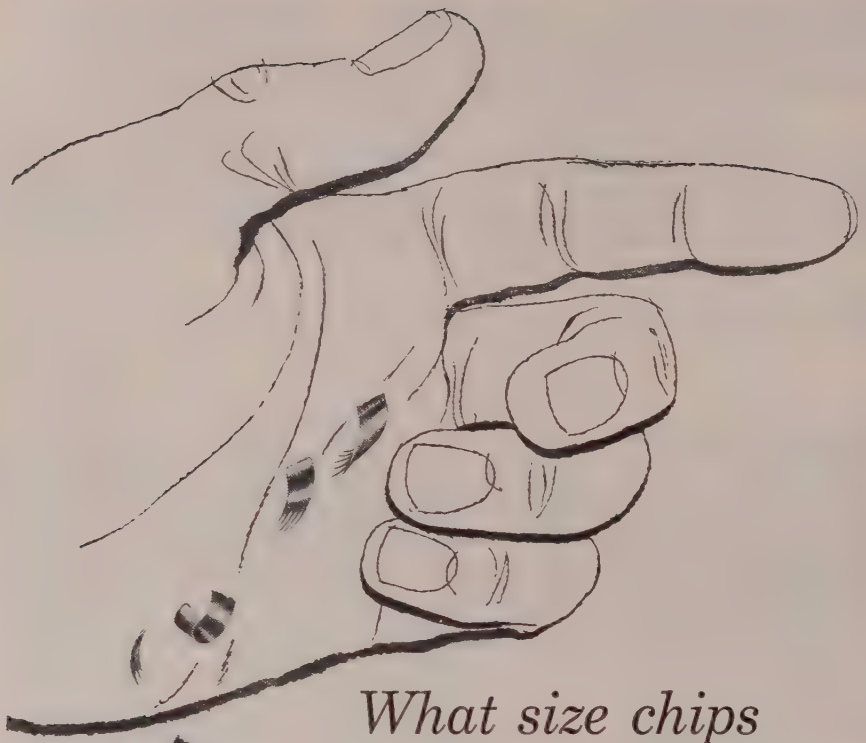

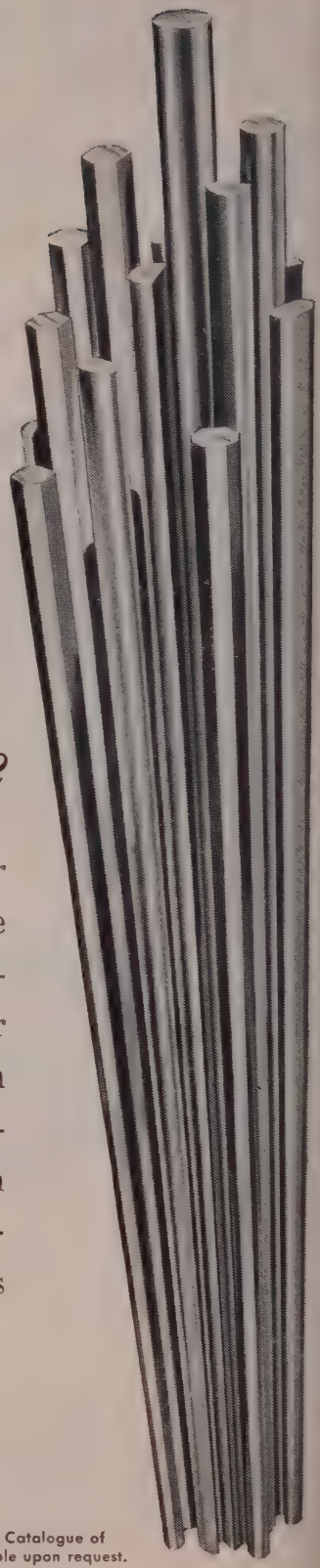

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Profiling Time Reduced

BY SWITCHING to Kendex triangular insert tungsten carbide tooling, profiling time on 5¼-inch diameter SAE 4340 steel rotor yoke forgings (90 to 120 pounds per square inch tensile strength) has been reduced from 2½ hours to 25 minutes floor-to-floor time at Piasecki Helicopter Corp., Morton, Pa. The work is handled on a 7½-hp Reed-Prentice 20-inch engine lathe having a shop-built cam profiling fixture.

Turning Time Cut—Using Standard Kendex style 3TKD-50 tools having triangular inserts of Kennametal grade K3H, the job is handled at 4½ times greater surface speed and up to five times the previous depth of cut taken. Now only four passes per piece are necessary for a floor-to-floor time of 25 minutes.

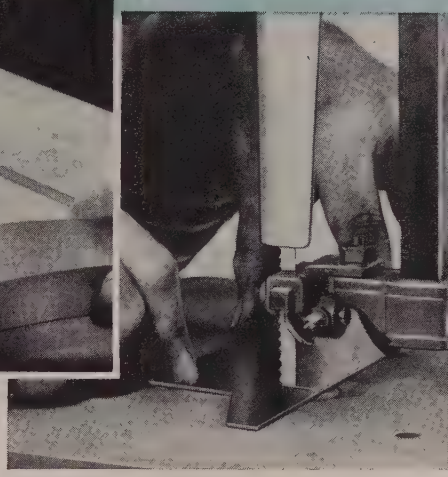
Under the new tooling setup, feed on roughing is 0.018-inch per revolution and 0.010-inch per revolution for finishing. Revolutions per minute are 405 at 556 sfm. Depth of cut is 0.100 inch on roughing and 0.040 inch for finishing.

Tool Changes—Piasecki's previous tooling setup required several tool changes during cutting operations on each piece. Under the new setup, two pieces are profiled and then triangular carbide insert is quickly indexed to a new cutting edge. Since three cutting edges are available, six rotor yokes are rough and finish-turned after which the insert is replaced with a new one.

INDEXABLE INSERT TOOLS
. . . work rotor yoke forgings

Strike up band saw profits

...WITH ATKINS Silver Steel®



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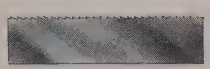
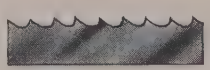


CONVENTIONAL TOOTH . . . for top performance in the toughest ferrous metals



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Trend Is Concentration

THREE BUILDINGS which will house experiments of making, shaping and processing iron and steel from raw materials to finished products are being constructed by U. S. Steel Corp. in Monroeville, Pa. The laboratory will consolidate all of U. S. Steel's Pittsburgh district research and development operations, which are now scattered in four Pittsburgh locations and two district steel plants. The facilities are expected to be complete early in 1955.

The new Monroeville setup will contain pilot production and melting facilities. Here the company hopes to do more instrument making and more studies of problems in melting and manufacturing. Eight technical divisions of the research and development laboratory will be concentrated here. Employment is expected to total about 350. Dr. Robert B. Mears will direct their work.

Division Specialties — Of the eight laboratory divisions, the blast furnace practice division conducts investigations to increase productive capacity of blast furnaces. Chemical engineers study preparation of raw materials from which blast furnace iron is made. A coal, coke and coal-chemical division evaluates types of coal and methods of carbonization.

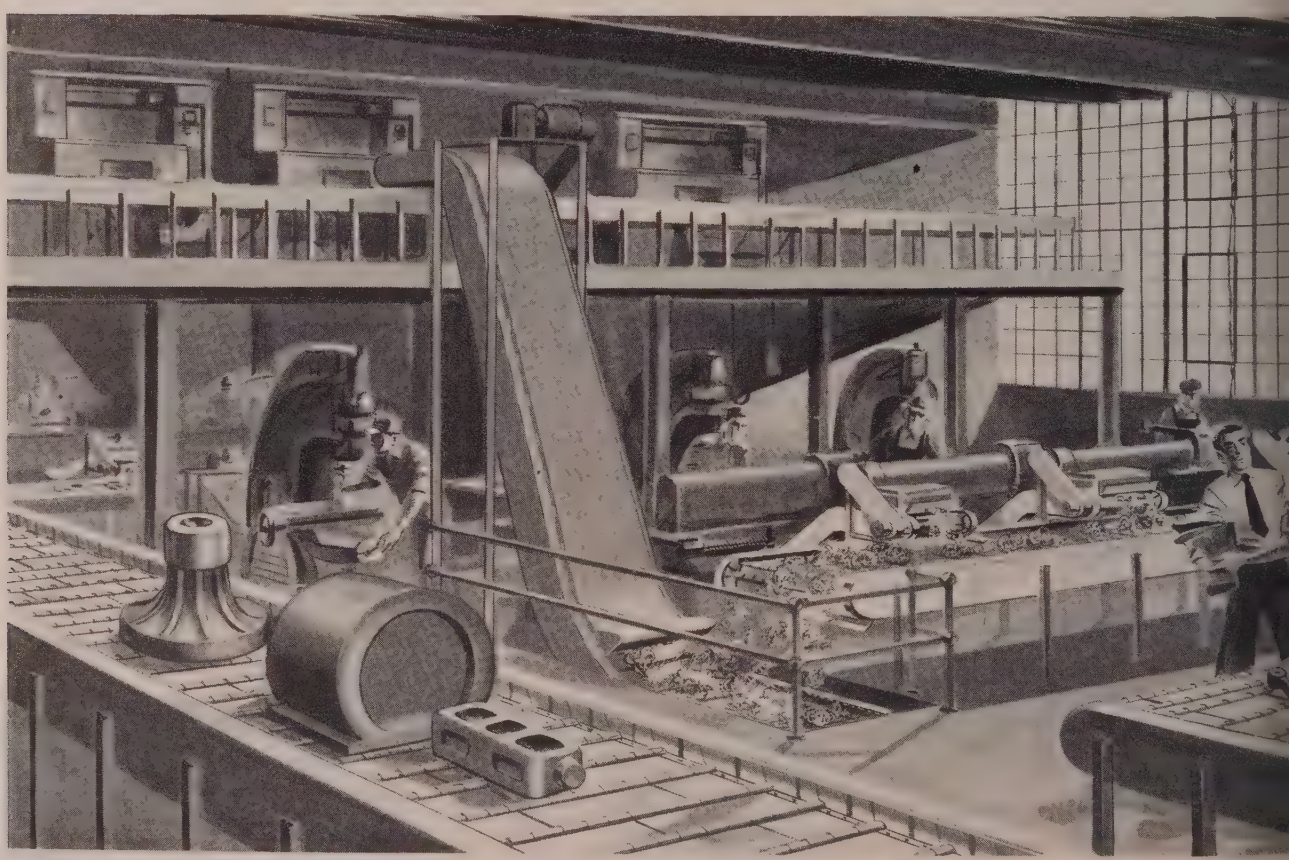
CONSOLIDATING RESEARCH
. . . new center for U.S. Steel

The physical metallurgy section is divided generally into metallography, mechanical metallurgy and development of new and improved steels for various applications. Research here is also directed to the development of improved coatings, metallic and ceramic, and improved coating methods for sheet metal products.

In process metallurgy, division activities are directed to surfaces. Their particular responsibility is to study causes of corrosion and methods of preventing corrosion reactions.

Service Life—The tin plate quality division evaluates effects of steel processing and coating variables on the service life of cans and closures made of tin mill products. Samples submitted for examination by the physics and analytical chemistry division include raw materials, steel itself at many stages of its processing and many materials with which steel comes into contact.

Work of the electromechanical division includes development of control devices, design and construction of special equipment for all divisions, as well as mainte-



nance of buildings and utilities.

What Researchers Will Do — Since eight divisions will be concentrated in the new buildings, U. S. Steel says they will be better equipped to expand and improve research in each of the divisions.

RESEARCH TECHNIQUE

Tracers Show the Way

RADIOACTIVE tracers are commanding increasing attention in metallurgical research. Previously applied successfully to many medical, pharmaceutical and chemical uses, the tracers now provide a valuable technique for tracking material through processes.

A good example is the aluminum research laboratories operated by Aluminum Co. of America at New Kensington, Pa. There Alcoa researchers are using radioactive tracers in lubricant evaluation, corrosion-resistance studies, analytical chemistry, alloy development and metal flow during extrusion.

Measuring Bearing Wear—In lubricant research, by using radioactive material the company reports measurement of wear on bearings more accurately and to a much finer degree than was possible by other means. These measurements are made possible, first by making bearings radioactive, then placing them in a normal working situation.

FLOW PATTERN STUDY
. . . tagged regions tell the story

Wear data are then obtained by measuring amount of radioactive material present in the oil bath covering the activated bearing after a given period of use. In tests completed at Alcoa's lab, excellent wear data were obtained in the microinch range.

Metal Flow—Another promising application is in study of metal flow during extrusion of aluminum alloys. Extrusion is limited by slow speeds on hard alloys and by the difficulty of obtaining smooth surface finish on the less hard alloys.

Under study are such facets as flow pattern, temperature, force distribution and other basic aspects.

Flow Pattern—To study flow pattern, pieces of aluminum alloy made radioactive in the Oak Ridge pile are placed into holes drilled in the ingot. The ingot is homogeneous, because the radioactive alloy differs in no chemical or metallurgical respect from the remainder of the ingot.

After the ingot is extruded, metal flow from the tagged regions can be established accurately by measuring activity of sections.

MAY-FRAN gives you greater economies in handling scrap and heavy abrasive materials

Whether you need a complete plant-wide system or a single scrap handling unit, MAY-FRAN can meet your requirements.

Two units form a complete MAY-FRAN materials handling assembly. The CHIP-TOTE automatic scrap conveyor removes borings, turnings and chips from high production machine tools while they are operating . . . thus eliminating shut-down time for manual scrap removal. Design features permit flexibility of installation according to type of machine tool, kind of metal scrap, rate of removal, etc.

The MAY-FRAN Hinged Steel Conveyor Belt transports scrap and heavy abrasive material to the disposal point. Precision formed, heavy gauge hinged-steel links are connected in horizontal rows by means of high-carbon steel rods. Side chains become an integral part of the belt, and outside links incorporate interlocking wings which remain positively engaged at all times. Link and rod construction eliminates fall-through.

For full utilization of vital machinery and skilled manpower, mechanize your handling of scrap and heavy abrasive materials with a MAY-FRAN automatic system.

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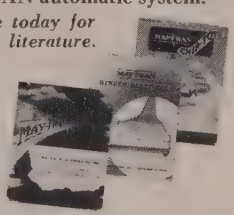

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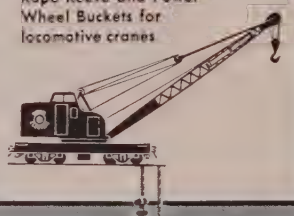

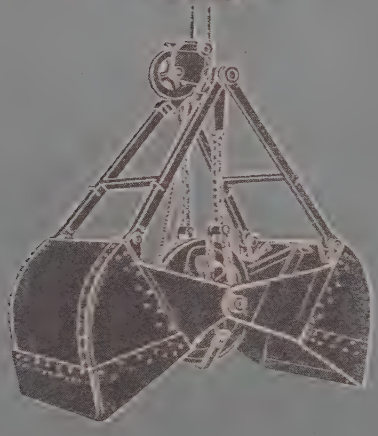

Brownhoist Buckets are designed for specific jobs and especially engineered to meet the toughest materials handling requirements. They take deep, full capacity bites that move more materials per lift, thus making possible considerable savings in man-hours and production time. They are built for endurance and dependability, the same qualities that have accounted for Brownhoist leadership in the bulk materials handling field for more than three quarters of a century. Railroads, steel mills and dock operators who are loading and unloading coal, ore, slag or other bulk materials will find it pays to discuss their requirements with Brownhoist engineers.

BROWNHOIST builds better cranes

CLAMSHELL BUCKET

250 TON WRECKING CRANE

COAL-ORE BRIDGE

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164

Metal Powder Poles

POLE PIECES of soft pure iron have the best magnetic properties.

However, most electric instrument pole pieces have odd shapes which require difficult and costly machining operations to produce them from low carbon, pure iron plate or bar stock.

Soft iron, being extremely tough and ductile, tears and drags when it is shaped by cutting tools. Not only is the labor cost high, but tool replacement expense can be a major factor.

Cost Consciousness — Conscious of high manufacturing costs, development engineers at General Electric's Meter & Instrument Department, West Lynn, Mass., have solved some of their production problems by compacting the pole pieces of electrolytic iron powder. It's produced by National Radiator Co.'s Plastic Metals Division.

Simple to fabricate pole pieces from iron powder, high purity and exceptional softness are important characteristics of the electrolytic iron powder produced by Plastic Metals, making it ideally suited for the manufacture of pole pieces.

Compacted to High Density — This powder can be compacted to unusually high density which, after conventional sintering, provides desired high permeability. With no machining, General Electric reports it is making excellent pole pieces from iron powder. No problem is presented if drilling or tapping is required.

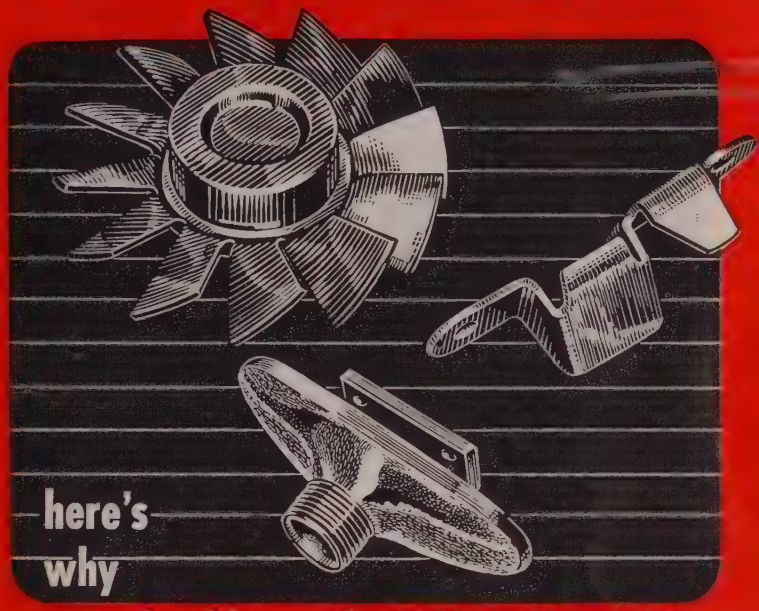
Each part is carefully studied before production is started and powder metallurgy must, in every case, justify its use. The decision, in most cases, hinges on how much machining is involved.

Nickel-Chrome Casting Specs

First revision since 1951 of the standard designation list covering the most popular grades of nickel-chromium alloys used for heat and corrosion resistant castings has been published by Alloy Casting Institute. It incorporates designation changes and several additional alloys.

Copies of the list may be had by writing ACI in Mineola, New York.

if you buy stampings...



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NATIONAL SERVICE—We can solve your stamping problems whether you're in San Francisco, Denver or New York. There are experienced De-Sta-Co stamping sales engineers in twenty major industrial areas who are ready to give you qualified on-the-spot recommendations.

ASSEMBLY FACILITIES—De-Sta-Co offers you complete assembly facilities and such operations as light machining, spot welding, riveting, drilling, reaming, etc. We are prepared to do complete production, from raw materials to shipping, under one roof.

LONG RUNS A SPECIALTY—When your requirements call for large volume production of parts, our plant is geared to produce them by the most efficient and economical means. A large group of Automatic presses in varied capacities assures proper placement for maximum efficiency.

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Our facilities are best-suited to the processing of light to medium-heavy fabrication of materials up to ⅜-inch thickness. Our operations include such specialized production methods as Multi-Stamping; an automatic method of processing small, intricately-formed parts in a single 4-slide machine. Precision stampings such as refrigerator intake and discharge valve reeds, made from high carbon, heat-treated and ground imported valve steels, are produced to critical tolerances in our precision parts department. Knuckle-action presses, accommodating up to 400-ton capacity, perform close tolerance coining—can frequently save you the additional expense of a grinding or machining operation. Our bed areas range from 10″ x 12″ to 48″ x 72″, pressures from 5 to 250-tons. We draw to 4″ deep.

Other De-Sta-Co products are Toggle Clamps for jigs and fixtures, Precision Washers, Arbor Spacers and Shims, Shim and Feeler Stock.

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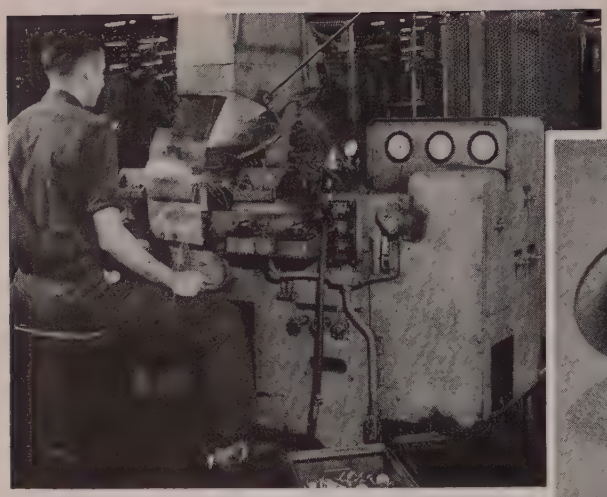

Flash welder in action. Note arrangement of palm switches that prevent operator from injury when clamps are closing. Dials and calibrated scales permit recording and duplicating of welds on exhaust valves, shown in inset

By LESTER F. SPENCER

Dissimilar Metals . . . CAN Be Flash Welded

First proved with ferrous and certain nonferrous metal combinations, new equipment and techniques can weld copper to aluminum in all forms, including tubing

FLASH welding of dissimilar metals need be no problem provided recommended practices are employed. These can be obtained from an authoritative source such as the American Welding Society; however, the services of both the material supplier and the manufacturer of welding equipment can also be used to advantage.

In many instances, the information derived on similar problems can be used only as a guide. Actual experimentation is required to establish those variables inherent in flash welding, establish the production routine and set up a test standard which will determine quality.

Know the Metals — Welding of dissimilar metals requires a knowledge of the metallurgical characteristics of the materials to be welded. Thus, where a material has a high hardenability, which is characteristic of many of the engineering steels currently employed, the use of a preheat, a post-heat or a combination of these two additional steps may be required.

Purpose of these precautions is to retard the cooling rate of the material along with a control of heat input after the joint has been welded. These precautionary steps, which often can be placed within the cycle used for flash welding, are a prerequisite for high hardenability steels to eliminate the possibility of cooling cracks which may either occur in the weld zone or, more likely, in that area adjacent to the weld zone.

In extreme cases, it may even be necessary to place the welded parts in a furnace which has been heated to a predetermined temperature so that an assured slow cooling to room temperature can be realized.

Some Applications—An example of the welding of dissimilar metals is the joining of a high speed steel to a high carbon steel in the production of a lathe stock. Two bar lengths, one of high carbon steel as the shank, the other a high speed tool steel as the nose, having a four and one-half inch diameter abutting section, can be flash welded successfully. Special procedures are mandatory to equalize differences of hardness, fusion temperature, electrical and thermal conductivity, crack sensitivity, etc. In addition, the flash welded part must be conditioned so as to permit subsequent machining.

Another example in the flash welding of dissimilar metals is the exhaust valve (above) as produced

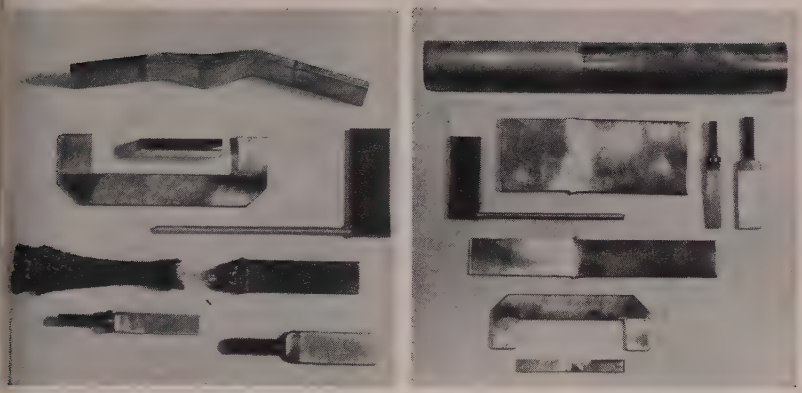

Photo illustrates a number of aluminum-to-copper flash-welded parts. Tubing with wall thicknesses only 0.05 inch have been welded at 800 joints per hour

by Thompson Products Inc., Cleveland.

The valve on the left indicates the area of weld along with the extent of flash extrusion, while the valve on the right indicates a simple bend test so as to check the strength and ductility at the weld junction.

These valves, which are used in some types of cars, trucks, buses, tractors, etc., consist usually of a head and upper portion of the stem which is made from one of several high temperature austenitic alloys, whereas, the lower portion of the stem, generally below the carbon relief, is made from an SAE 3140 steel or a comparable composition. The upper portion of the stem along with the head must resist extreme heat, friction, constant motion, wear and stress.

Control Vital — The control of the variables inherent in the flash welding procedure is indeed necessary in the production of these valves. This precludes the establishment of a production test schedule so as to maintain a high quality level of the finished product, since failure of one comparatively inexpensive valve may result in a costly engine overhaul.

Two Thomson flash welders are employed in the production of these valves. Sections to be welded are placed in air operated rocker arm clamps with the ends butted against work stops to establish the predetermined spacing. Clamps are closed by pressing two palm switches which are interlocked as a safety measure since it requires the use of both hands. Pressing a third palm switch initiates the welding cycle.

Flashing, upset, clamp release and platen return to start position is entirely automatic, the actual welding cycle taking place in but 2.8 seconds per weld. This method does not require the use of skilled help. Operator feeds the welder, taking parts from the left and depositing the finished work at the right.

Close Tolerances—Due to the precision operation of the equipment, allowances for flash-off and upset can be held to a minimum which means that dimensions of the finished valve can be held in close limits. In this specific case, the allowance for flash-off is 0.190 inch, whereas, the allowances for upset is 0.080 inch. As in most production runs, all essential data is recorded so that the production run can be duplicated.

The auxiliary controls are mounted behind the welder making a neat and accessible installation. Controls include ignitron contactor, load resistor (cage), power disconnect fuses, control disconnect fuses and control transformer. Control line is 110 volts for operator protection. Load resistors are necessary to insure proper firing of ignitrons on flash welding service.

Pinch-Off Dies—Primary function of the pinch-off dies is to assist in the removal of the upset material resulting from the flash welding cycle. Thus, by "pinching" the extruded metal close to the surface of the work, pinch-off dies cut away the flash completely or make it extremely easy to remove during clean-up.

In addition, the pinch-off dies support the work close to the point of weld throughout the welding cycle, this factor being of considerable importance during the final upset forging. This will aid in minimizing the heat affected zone along with eliminating distortion.

Copper to Aluminum—Welding nonferrous materials, including combination of dissimilar metals, has been possible for a long time; however, economical welding of copper to aluminum is perhaps the most difficult combination. This is particularly true in the welding of tubing.

This method of joining is now competitive with the previously used methods of soldering and brazing; production methods are developed to a degree that a high quality product with minimum reject is experienced. Resultant joint is ductile and has a weld strength comparable to that exhibited by the parent metal. In addition, the electrical characteristics of this metal combination are satisfactory.

IN WELDING TWO DISSIMILAR METALS, CONSIDER:

To what extent do the metals differ in electrical conductivity?

What is the difference in melting points of the two metals?

Will an undesirable metallurgical structure form during welding which may cause brittleness or cracking in the weld area? If so, what special procedures are to be incorporated to restore ductility or eliminate cracking?

Is there possibility of joint corrosion due to electrolytic action if the weld is exposed to a corroding medium?

Will the metal combination chosen for welding perform satisfactorily under conditions of field service?

Is the design of the part amenable to flash welding so that consistent results can be obtained at minimum cost?

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Airless Abrasive Blasting

RECONDITIONING cleaning of 30 and 55-gallon steel drums before painting and coating operations can be done with a new airless abrasive blasting machine developed by American Wheelabrator & Equipment Corp.

The machine handles drums used for holding chemicals, industrial process materials, oil, gasoline, grease, asphalt, paint, foundry core binders, plastics and the like. It is capable of cleaning the exterior surfaces of closed-end drums and both exterior and interior surfaces of open-end drums, together with the lids.

Hydraulic Table — Machine is equipped with a hydraulically-rotated table with a partition that divides the machine into two compartments or work stations. Each station consists of two power driven spinner shafts that rotate one drum in the blast zone, so continuous operation can be maintained.

Cleaning is done by abrasive hurled centrifugally by a rotating bladed wheel mounted in the rear wall of the cabinet. Spinner shafts are pivoted to enable the position of the drum, with respect to the blast, to be adjusted so either open or closed end drums can be hit at the proper angle by the abrasive. The machine is pushbutton started and stopped.

Abrasives Reclaimed—The same abrasive can be used over and over. After striking the drum, the abrasive particles fall down into a hopper below, from where they are conveyed by an elevator to the top of the machine. Contaminants are removed from the drum, abrasive worn too small sorted out and the good abrasive fed back to the hurling wheel for reuse.

Rubber Pipes Brine Solution

Pointing up the growing acceptance of plastic for difficult piping jobs, resin-rubber plastic pipe, carrying a concentrated brine solution, has passed trial tests and is now in operation in a water softening service plant in Winona, Minn.

The pipe, made from Kralastic, a synthetic resin-rubber plastic produced by Naugatuck Chemical Division, U. S. Rubber Co., Akron, is in use in the Culligan soft water service plant of Winona.

NEW PRODUCTS and equipment

Reply card on page 147 will bring you free literature, editorial clips or more information on new products and equipment described or advertised in this issue

Chemical from Oil

. . . bonds to metal surface

A chemical-from-oil product is expected to result in a host of pioneer products, including paints with greatly increased resistance to scratching, harsh chemicals and other abuses. Glidden has been licensed to develop surface coating uses for the petrochemical called C-Oil.

It is a heavy-bodied, sticky, almost colorless liquid based on

butadiene. Semi-commercial quantities of the petrochemical are being produced at Esso Laboratories. Besides being used as a surface coating, ability of the films to bond to metal surfaces indicates extensive industrial application. Standard Oil Development Co. and Glidden Co.

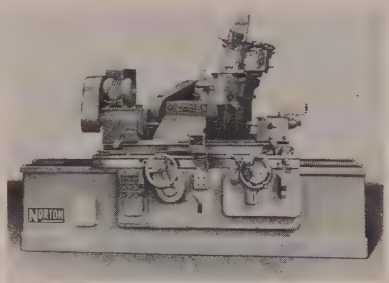
FOR MORE DATA CIRCLE NO. 1 ON REPLY CARD

Grinding Machine

. . . with click count index

Norton's type CV-4 semiautomatic angular wheel slide grinding machine rapidly grinds thrust surfaces and adjacent diameters simultaneously in a single, automatically-controlled plunge grind. It produces a concentric grain pattern in the finish of the shoulder or thrust surface ground.

The CTU type wheel feed mechanism is hydraulically rotated, micrometer-screw fed. It includes



a click count index with which settings for work diameter reduction in increments as fine as 0.0001 inch are made instantly without visual attention. Norton Co.

FOR MORE DATA CIRCLE NO. 2 ON REPLY CARD

Tapping Machine

. . . eliminates tap breakage

Two-way tapping machine is equipped with a type of adjustable torque-releasing driver which has

virtually eliminated tap breakage bugaboos.

A spring-loaded centering plug absorbs shocks when bottoming in blind holes. Cushioning stop and instantaneous release of the driver permit bottom-tapping at full speed to full depth without breakage. The over-running roller drive releases completely when torque approaches strength limits of the tap. Scully-Jones & Co.

FOR MORE DATA CIRCLE NO. 3 ON REPLY CARD

Comparator

. . . uses lens, reticles

Pee Gee pocket comparator is used to measure extremely small parts or minute dimensions on large parts.

The measurements are accomplished through use of powerful magnifying lens and tiny transparent patterns called reticles.

A

The reticles are actually extreme reductions of large precise master layouts. Reticles available are radii, threads, thickness, diameters and dimensions. Fine adjustment is accomplished through a built-in screw arrangement. National Tool Co.

FOR MORE DATA CIRCLE NO. 4 ON REPLY CARD

Gage Head

. . . needs no setting master

A universal gage head, called the AirProbe, can be mounted on a variety of fixtures, making it possible to check dimensions of almost any type, either single or multiple. It can also be applied to the regular Federal catalog gages,

saving necessity of several gages.

A spindle-like device, not larger than a cigaret, it's accurately calibrated and requires no tolerance setting masters. Available ranges are 0.003, 0.006, 0.015 and 0.030 inch. Federal Products Corp.

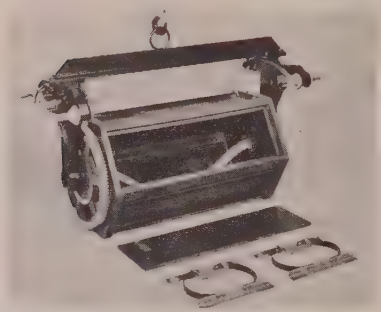
FOR MORE DATA CIRCLE NO. 5 ON REPLY CARD

Barrel Plating Equipment

. . . with rubber cylinder

Udylite Corp. announces development of a new plating barrel with a cylinder made of Tempron hard rubber.

Among advantages inherent with the new material and specially-designed construction are: Tempron withstands high temperatures, has excellent abrasion resistance and



withstands strong acids. System of interlocking panels and ribs not only makes it strong but also permits easy individual replacement of parts whenever necessary. Udylite Corp.

FOR MORE DATA CIRCLE NO. 6 ON REPLY CARD

Gear Gaging, Sorting

. . . machine makes four checks

A fully-automatic gear gaging and sorting machine is the first in a line of Red Ring gear inspection

equipment for automated production lines. It embodies entirely new basic concepts in the art of high-speed gaging and sorting, making up to four checks on gears for both size and helix angle accuracy.

Inspection of the gear is accomplished by its passage between the master gears. Movements of the gaging master gear control hinged covers in the exit chute through electric controls and lever arrangements. Errors in helix angle or size are directed to a separate compartment. National Broach & Machine Co.

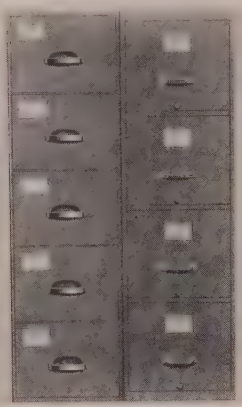
FOR MORE DATA CIRCLE NO. 7 ON REPLY CARD

File Cabinet

. . . extra drawer, same height

File with the extra drawer is the feature of the new line of Kompakt file cabinets. Line is available in 3-drawer desk height, 4-drawer counter height, 5-drawer standard 51-inch height and 6-drawer heights, designed to accommodate an extra drawer in the same vertical space as standard files.

By using the 6-drawer unit, for



example, in place of existing 4-drawer files, filing area can be reduced one-third. Remington Rand Inc.

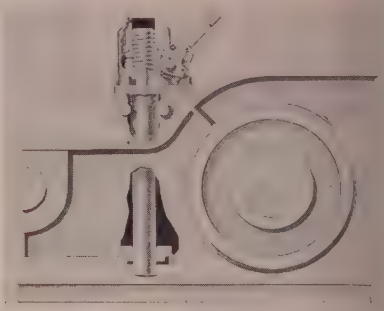
FOR MORE DATA CIRCLE NO. 8 ON REPLY CARD

Worm Gear Jack

. . . permanent part of crane

This worm gear jack is designed so it can be installed as a permanent part of the crane after only a few slight modifications to the crane's structural sections. When installed, the 25-ton-capacity jack can be used to lift cranes for such repair jobs as replacing bearings, bushings and wheels and general lubrications.

Housing is packed in grease and sealed. Built to fill exact customer specifications, the jack has a 3⅜-inch diameter lifting screw.



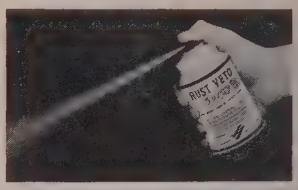
Length of screw varies according to lift necessary to raise the truck off the track. Duff-Norton Mfg. Co.

FOR MORE DATA CIRCLE NO. 9 ON REPLY CARD

Rust Dispenser

. . . protects small items

Rust prevention can be done the easy way with 12-ounce pressurized, pushbutton cans containing



Rust Veto Spray. They are especially handy for protecting small items.

The thin, transparent film protects metal parts for long periods and need not be removed when the item is ready for use. It is sold only in cases of twelve. E. F. Houghton & Co.

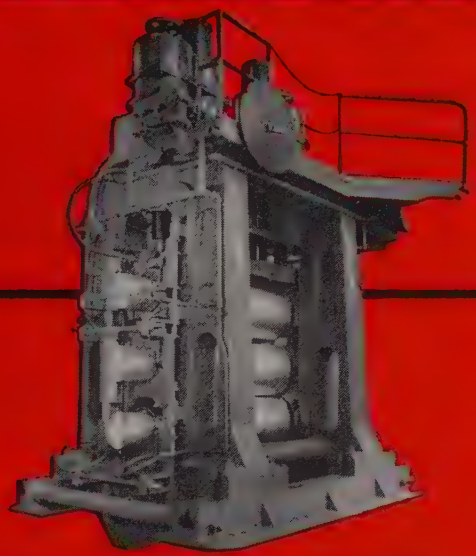
FOR MORE DATA CIRCLE NO. 10 ON REPLY CARD

Corrosion Protection

. . . quicker, longer protection

VPI-250 corrosion inhibitor, a crystalline amine nitrite compound, offers quicker, longer rust prevention. It flows freely, is a white powder about as fine as talcum, and will not clog a flocking gun. It can be applied with a squeeze bottle, a salt shaker or similar device.

Advantages: Material does not have to be applied directly to the surface it is to protect; the minute crystalline film of VPI does not have to be removed from equipment before it is put into op-



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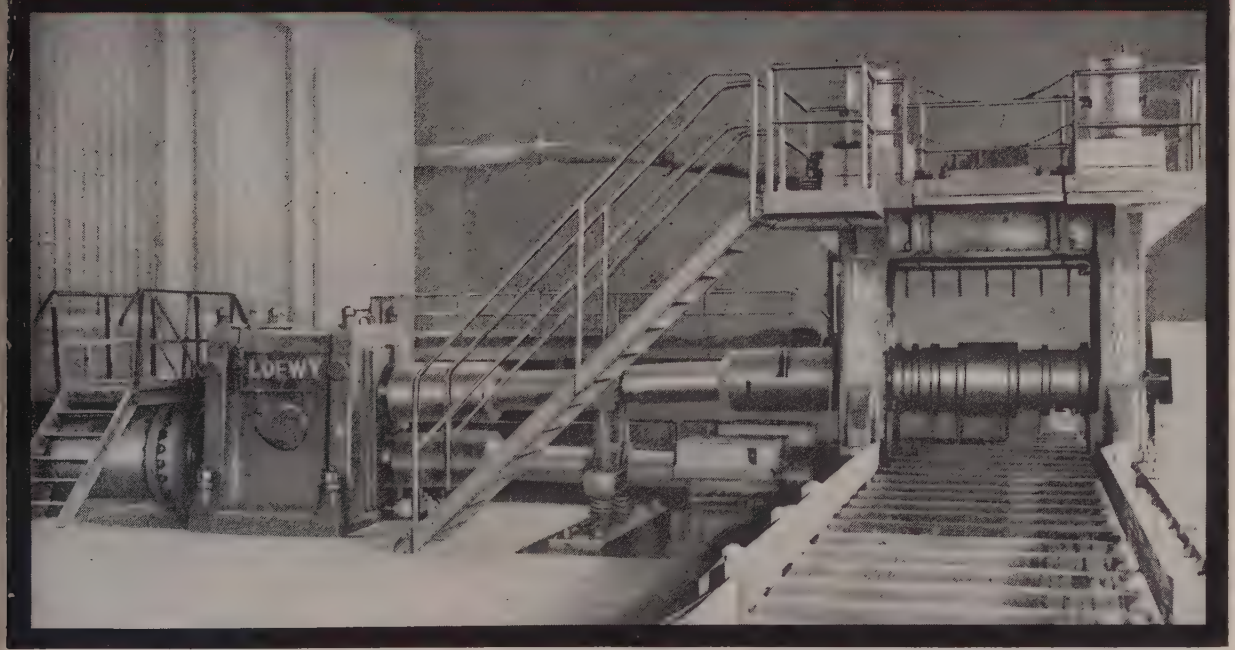
26" Three-high Blooming Mill Stand, part of a complete Blooming, Slabbing, Structural, Wire Rod and Strip Mill.



26" Two-high Blooming Mill, part of a complete Blooming, Slabbing, Structural and Strip Mill Installation.

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2. **All parts of the finished sling must have a breaking strength equal to the catalog strength of the sling body.**
3. **All fittings and attachments must withstand a proof-test equal to at least two times the rated capacity without permanent distortion.**
4. **Actual field service tests of each design.**

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It means that you can be sure that your men, materials, and machines are given the highest protection against injury during lifting operations.

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See your ACCO *Registered* Distributor or write to us for literature and his name.

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plus Links Shackles Hooks

eration; only small quantities of the material are required; small items can be removed from a VPI

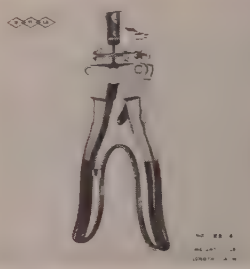
protected atmosphere, used and then replaced without need for addition protection. Shell Oil Co.

FOR MORE DATA CIRCLE NO. 11 ON REPLY CARD

Buttweld Tools

. . . unskilled can operate

The Utica KB-14 and KB 14B Buttweld tools will buttweld different sizes of the same or dissimilar nonferrous metals without the use of heat, electricity or



chemicals. Plier-action-operated, they weigh just 5 pounds and are 14 inches long. They can be operated by unskilled personnel.

The manufacturer states that production of these tools is geared to meet special requirements of individual firms. Utica Drop Forge & Tool Corp.

FOR MORE DATA CIRCLE NO. 12 ON REPLY CARD

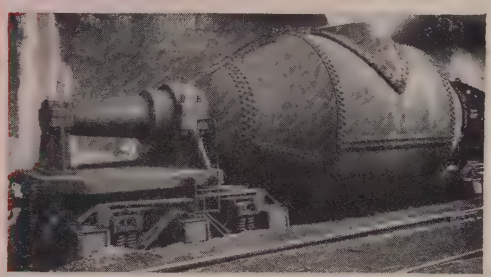
Band Saw

. . . is two-speed machine

Atlas 12-inch metal-cutting band saw is a two-speed machine that makes quick work of trimming and contour sawing a wide range of metals. It cuts to the center of a 24-inch circle, has a 6¼-inch capacity above 14 x 14 inch tilt-

A. P. GREEN
KX-99

In . . .
Complete Blast Furnace Linings
Hot Metal Mixers
Hot Metal Cars



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1. Special high fired, Missouri super duty brick.
2. No sign of carbon monoxide disintegration in 1000 hour test at 900°F.
3. Apparent porosity in the range of 8 to 12 per cent with an average of 10 per cent.
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5. Average modulus of rupture 1800 to 2500 pounds per square inch.

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but a statement of FACT

FOR some months now, we've been signing all our ads this way. It expresses our 63-year-old business philosophy so well that we believe it deserves an ad of its own.

"Putting more sense in your abrasive dollar" is another way of saying that we sell superior grinding *performance*—not just grinding wheels and belts. Because your chief concern—and ours—is *how much does it cost you to do the whole job?*

Analyze *all* the factors involved: the cost of your skilled labor, the cost of running your machines and your grinding department, the cost of rejects, and the cost of the wheels or belts. Our primary function is to insure you lowest *total* grinding cost... through qualified technical abrasive engineering "know-how."

The responsibility we assume does not stop there. You will get more dependable performance on every grinding job... by CARBORUNDUM's continuous engineering development—brought to you, day in and day out, through CARBORUNDUM's nation-wide network of Industrial Distributors and Sales Offices.

May we help you put more sense in *your* abrasive dollar?

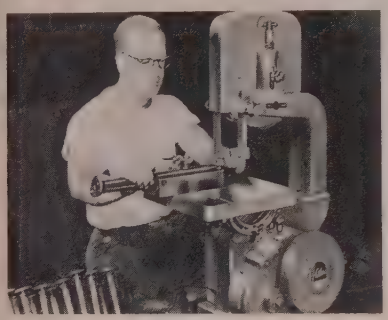
CARBORUNDUM
REGISTERED TRADE MARK

the FIRST name in grinding

80-41

ing table and two blade speeds of 100 and 250 fpm.

Features include: Floating motor rail for quick speed changes; easily-adjustable blade guides and



ball bearing blade support wheels; conveniently - located controls; compact design for portability. Atlas Press Co.

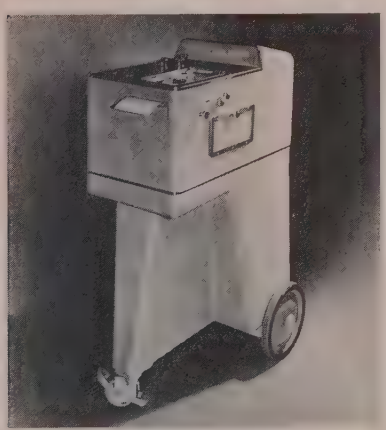
FOR MORE DATA CIRCLE NO. 13 ON REPLY CARD

Electrical Recorder

. . . pattern shows errors

Designed to equip analytical measuring machines and hob and worm lead machines for electrically-recorded charts, the 1603 electrical recorder, structurally independent of the pickup, operates on 115-v, 60-cycle ac currents.

True condition of an inspected surface is accurately revealed on



the machine's recorded chart. A recorded graph reveals, by nature of the pattern, the cause of errors. To help reduce vibrations transmitted through the floor, and to provide greater movability, a rubber wheel is mounted at each pivotal point. Illinois Tool Works.

FOR MORE DATA CIRCLE NO. 14 ON REPLY CARD

SignaLarm

. . . monitors temperature

By red and green signal lamps and an audible alarm, the SignaLarm temperature monitoring system, indicates temperature condition at various points as they are scanned. Master measuring unit can be pre-set to give signals at high or low point.

Different temperature monitoring systems can be built up from these standards units. Each SignaLarm can handle up to several hundred thermocouples. Additional systems can be installed for greater capacity, or for high-speed scanning or monitoring various points independent of one another. Thermo Electric Co. Inc.

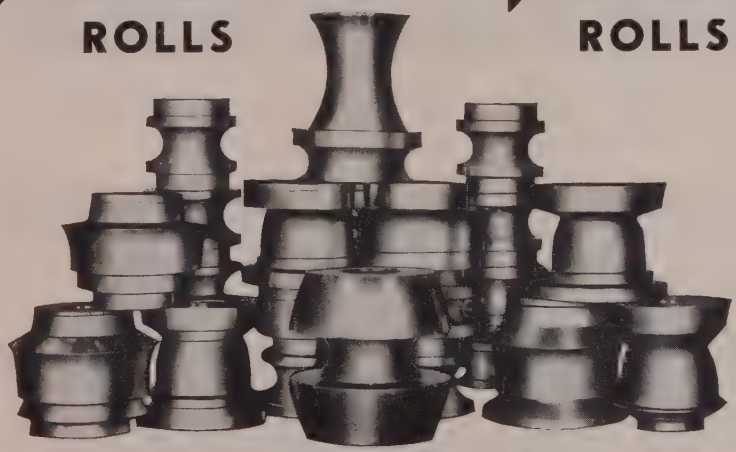
FOR MORE DATA CIRCLE NO. 15 ON REPLY CARD

DC Rectifier Brake

. . . direct action, short stroke

This new P&H brake, with sturdy selenium rectifier which has no moving parts, eliminates the draw-

▶ FORMING ROLLS ▶ TUBING ROLLS



▶ *To your specification or ARDCOR design —for all makes of roll forming machines*

Made of ARDCORLOY—a special alloy steel.

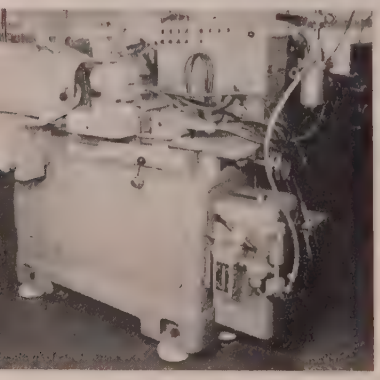
Maximum production speeds—better products. Any desired profile up to 36 inches in diameter.

Also, manufacturers of Straightening, Pinch and Leveller Rolls to customers' specifications.

American ROLLER DIE CORPORATION
29520 Clayton • Wickliffe, Ohio

NO LAGGING MADE THIS PRESS "MOBILE." This 45-ton Perkins punch press was moved 200 feet — and was out of production only 5 minutes, because it was on Leveling Barrymounts.

MACHINERY THAT MOVES WITH THE TIMES CUTS COSTS



GRINDER ACCURACY PROTECTED. Leveling Barrymounts protect this Heald Size-Matic from external shock while grinding the inner races of miniature precision ball-bearings to within tenths of thousandths of an inch.

Your product costs can be cut because mobile machinery offers you flexible production layouts. Machine maintenance and reject costs are cut because damaging external shocks are isolated. Installation costs are cut because requirements for certain foundations are eliminated—no lag bolts to set or shims to drive, yet machines will not walk.

Write *today* for the story of MACHINES THAT MOVE WITH THE TIMES

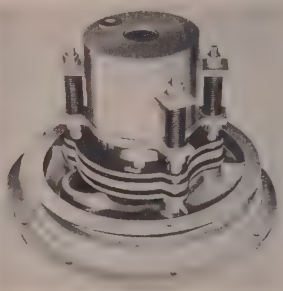
THE BARRY CORP.

1926 PLEASANT STREET
WATERTOWN 72, MASS.

SALES REPRESENTATIVES IN ALL PRINCIPAL CITIES

backs of ac solenoids. Offered on the P&H type R Hevi-Lift hoist and Trav-Lift crane, it provides direct action with short stroke.

Low voltage operating coils have fewer turns; inductance is



less and action quicker. Setting and releasing of brake is fast. Coil is sealed in pot with insulating-type compound. Magnet pot and leads are stationary. Harnischfeger Corp.

FOR MORE DATA CIRCLE NO. 16 ON REPLY CARD

Liquid Leak Detector

. . . simple surface application

Leak-Tec is a sensitive liquid developed from a special formula for detecting the most minute leaks of gases, chemicals, oils, air, etc. By squeezing the polyethylene container equipped with a special dispenser, Leak-Tec is applied to the surface or item to be tested.

It is nonflammable, nonexplosive and noninjurious. It can be used not only for maintenance but for

a hole here makes waste...

a hole here makes a saving

Crucible Hollow Tool Steel Bars are a boon to the metalworking industry. The hole in these quality bars enable toolmakers to eliminate drilling, boring, cutting-off and rough-facing operations. This cuts production time, boosts machine capacity and saves scrap losses.

They are available now, in any of Crucible's famous tool steel grades, in almost any combination of O.D. and I.D. sizes. And you can get *immediate* delivery of five popular grades — KETOS oil-hardening, SANDERSON water-hardening, AIRDI 150 high carbon-high chromium, AIRKOOL air-hardening, and NU DIE V hot-work tool steels — from a conveniently located Crucible branch warehouse.

Let your Crucible representative show you how these steels can best help *you*.

CRUCIBLE first name in special purpose steels

54 years of Fine steelmaking **HOLLOW TOOL STEEL**

CRUCIBLE STEEL COMPANY OF AMERICA • TOOL STEEL SALES • SYRACUSE, N. Y.

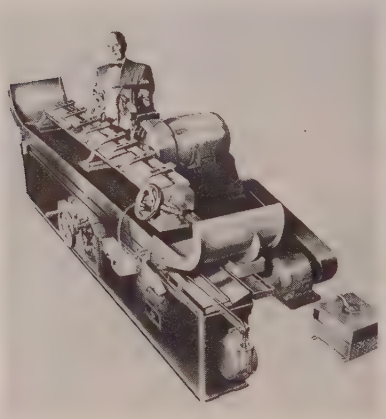
inspection purposes on finished products and delicate instruments on the assembly line. American Gas & Chemicals Inc.

FOR MORE DATA CIRCLE NO. 17 ON REPLY CARD

Knife Grinding Clamp

. . . for faster grinding cycle

Two new time-saving devices are designed to provide a faster grinding cycle and more efficient use of operators' time. One feature is an air-clamping device designed to provide instantaneous clamping of the knife in grinding position. Knife clamps are forced by air pressure, button-controlled.



Another feature provided with the Rogers NT and 220 series is automatic timing service. This patented device automatically stops the grinder, including motors, after a predetermined grinding period. A safety device prevents accidental starting of the knife table or grinding head. Samuel C. Rogers & Co. Inc.

FOR MORE DATA CIRCLE NO. 18 ON REPLY CARD

Low-Temperature Tester

. . . has 1-cu-ft capacity

A test unit, primarily for low temperature testing, is adapted easily to high and low temperature operation. The basic cold unit has a capacity of 1 cu ft.

Unit has a temperature range from −120° F to −200° F to permit testing operations at high temperatures. Testing chamber is 12 x 12 x 12 inches deep, having a capacity of 400 Btu per hour at −120° F, with convection fluid in chamber. Cincinnati Sub-Zero Products.

FOR MORE DATA CIRCLE NO. 19 ON REPLY CARD

FREE LITERATURE

Catalogs and Clip Sheets

Reply card on page 147 will bring you free literature, editorial clips or more information on new products and equipment described or advertised in this issue

Prestressed Concrete

John A. Roebling's Sons Corp.—"Tensioning Materials for Prestressed Concrete" gives detailed information and charts on characteristic properties of their wire and strand. It includes descriptions and photographs of various construction jobs in which prestressing has been used.

FOR MORE DATA CIRCLE NO. 20 ON REPLY CARD

Tin Properties

Tin Research Institute Inc.—A completely revised edition of the 55-page book "The Properties of Tin" presents all the published atomic and nuclear, physical, physico-chemical and metallurgical data concerning pure tin. For many of the properties, the literature provides alternative values according to various investigations.

FOR MORE DATA CIRCLE NO. 21 ON REPLY CARD

Welding, Cutting Equipment

Liquid Carbonic Corp.—A welding and cutting equipment catalog lists this company's complete line of Casweld equipment. Designed for easy selection, it offers equipment for use in the entire flame field from welding and cutting to heat treating operations.

FOR MORE DATA CIRCLE NO. 22 ON REPLY CARD

Drilling, Tapping

Edlund Machinery Co.—Bulletin G54 answers machine tool buyers' and engineers' questions regarding functions and capacities of drilling and tapping machines. Included is a chart of specifications for drilling and tapping machines. Data is included on machinery that is designed to meet unusual or time-consuming production problems for drilling, reaming, tapping, spot facing and counterboring.

FOR MORE DATA CIRCLE NO. 23 ON REPLY CARD

Reproducing Punch

Remington-Rand Inc.—Punched card procedures, involving such functions as descriptions, analyses and breakdowns, can be speeded with Remington-Rand's multi-control reproducing punch. Detailed descriptions of the punch's functions—feeding, sensing, computing, punching, segregating and interfiling—are covered in a 6-page bulletin.

FOR MORE DATA CIRCLE NO. 24 ON REPLY CARD

Special Fasteners

Columbus Bolt & Forging Co.—A 38-page brochure details the endless variety of special fastening devices made to customers' blueprints by Columbus Bolt & Forging Co. Complete facilities for every conceivable requirement of special fastener production are operated by the company and described in the brochure.

FOR MORE DATA CIRCLE NO. 25 ON REPLY CARD

Cut Costs

Denison Engineering Co.—"Ideas on How You Can Cut Costs with Denison Multipress" briefly tells how, by using this press in blanking and forming, riveting, coining, drawing, testing, crimping and swaging, you can save on your production budget.

FOR MORE DATA CIRCLE NO. 26 ON REPLY CARD

Scrap: Steel Reborn

Institute of Scrap Iron & Steel Inc.—"Scrap: Steel Reborn," a 16-mm sound and color motion picture, shows where scrap comes from, how it is processed into a major raw material for making new iron and steel. It shows the cycle of preparation for reuse of steel. It identifies the origins of scrap, traces it through the processing operations to the charging

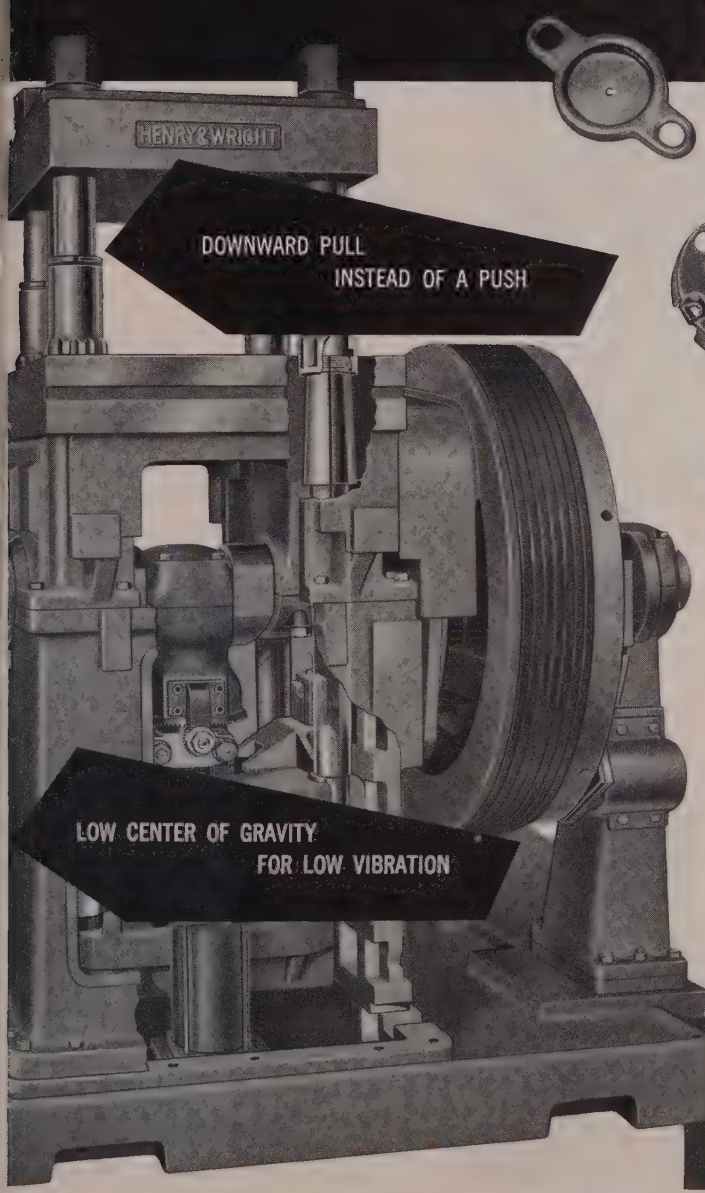
YOU CAN LINE UP 1 JOB AFTER JOB

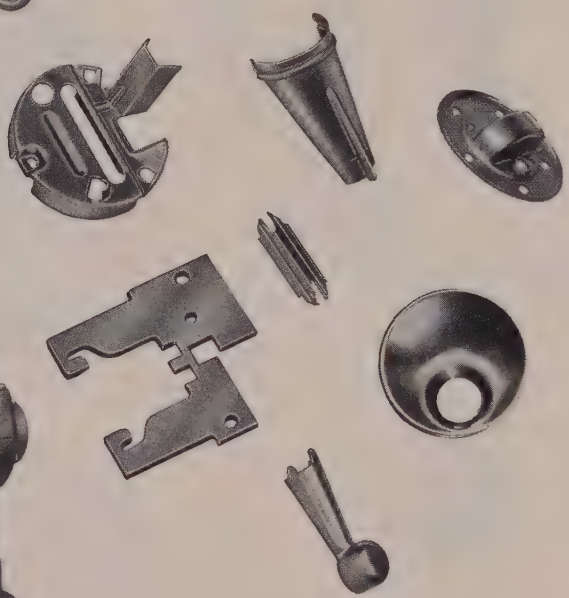
The Henry & Wright Dieing Machine is easy enough to set up so that moderate production runs are profitable.

You can schedule one job after another. Your H & W will get the work out, get it out right, and have it done when the schedule says it ought to be done.

Simple jobs that you want to complete at high speed. Close tolerance work. Tricky reverse bends. Full assemblies at one pass through the press. They all will go through your Henry & Wright, and with surprisingly short interruptions for setting up.

Four corner control of side thrust, and a downward pull instead of a push: These are two of the reasons why your Henry & Wright will withstand more off-centering of the die loads. Jobs like those shown can be easily run in sequence on an H & W.





Henry & Wrights are making production runs that designers never had dreamed could be stamped at a profit. Our representative would like to show you some of the pieces.

Please write to Henry & Wright, 441 Windsor Street, Hartford, Connecticut.

H&W®

HENRY & WRIGHT

DIVISION OF EMHART MFG. CO.

HARTFORD, CONNECTICUT

for a fabulous finish...

Jewel Brand
ABRASIVE BELTS

For grinding, smoothing, polishing — metal, wood, leather, plastics, rubber. A grit for every purpose— prompt service on every purchase.

ABRASIVE PRODUCTS, INC.
511 Pearl Street
South Braintree 85, Massachusetts

in the steelmaking furnace. Running time is 13 minutes, 3 seconds.

FOR MORE DATA CIRCLE NO. 27 ON REPLY CARD

Metals Research

Illinois Institute of Technology —Armour Research Foundation has published a 14-page brochure summarizing its facilities for metals research. It describes the personnel, their experience and the services offered. A chart illustrates the Armour Plan, a co-operative method of attacking research problems.

FOR MORE DATA CIRCLE NO. 28 ON REPLY CARD

Push-Type Cranes

Industrial Crane & Hoist Corp. —Expanded line of push-type cranes is featured in the new catalog PT-1253. A light-duty model available in five capacities and heavy-duty models available in seven capacities are described. Weights and dimensions are given for each model.

FOR MORE DATA CIRCLE NO. 29 ON REPLY CARD

Heliwelding

Air Reduction Sales Co.—A 16-page catalog details features of the Heliwelding process and the equipment used with it. It fully describes and illustrates, in actual welding operation, the manual air or water cooled holders, light or heavy-duty water-cooled machine holders for use with the semi-automatic equipment, and the automatic head.

FOR MORE DATA CIRCLE NO. 30 ON REPLY CARD

Welding Positioners

Harnischfeger Corp.—A descriptive bulletin on their welding positioners outlines important features and gives condensed specifications on four different models with capacities up to 35,000 pounds. An efficiency graph based on typical welding jobs enables the reader to get a quick picture of production advantages.

FOR MORE DATA CIRCLE NO. 31 ON REPLY CARD

Air-Gas Torches

National Welding Equipment Co.—"All About Air-Gas Torches" shows the importance of flame equipment to all industry. The company's experience in problems of changeover from manufactured to natural fuel gas is reflected in the brochure. Many torches and tips are shown for the first time.

USE A CARD

FREE CATALOGS and LITERATURE

NEW PRODUCT INFORMATION

INFORMATION ON ADVERTISED PRODUCTS

FREE EDITORIAL CLIP SHEETS

The 34 pages are illustrated and contain many graphs.

FOR MORE DATA CIRCLE NO. 32 ON REPLY CARD

Selectodyne Control

Whiting Corp. — Literature is available on the Whiting Selectodyne magnetic hoist control. What it is, how it operates, its advantages are covered, plus a brief description of the automatic load brake. Hoisting and lowering curves for the control are given in graph form in the 4-page brochure.

FOR MORE DATA CIRCLE NO. 33 ON REPLY CARD

Skip Hoists

C. O. Bartlett & Snow Co.—The 16-page catalog 110 shows sequence views of operation of weigh-type and plug-feed loading gates. It lists capacities of various bucket sizes under several height and speed conditions. Illustrations show adaptation to handling many different materials.

FOR MORE DATA CIRCLE NO. 34 ON REPLY CARD

Coating Systems

Mullins Non-Ferrous Castings Corp.—Carboline Co. Division offers data on test results of 60 different coating systems, applied on rusty steel panels. The data shows how both primer and finish selection are important when painting rusty steel in corrosive atmospheres.

FOR MORE DATA CIRCLE NO. 35 ON REPLY CARD

Centrifugal Pumps

Worthington Corp. — Saddle-mounted vertically-split centrifugal pumps are described in detail in a 7-page brochure. It describes materials of construction, coverages available, pressure-temperature limitations, with cross-section drawings of the various types of pumps in the line.

FOR MORE DATA CIRCLE NO. 36 ON REPLY CARD

Component Parts Catalog

General Electric Co.—A 100-page bound Component Parts Catalog GEC-1025 is designed specifically for original equipment manufacturers who incorporate electrical components into their products for resale. Over 2500 catalog numbers are listed, list prices and dimensional outline drawings are given.

FOR MORE DATA CIRCLE NO. 37 ON REPLY CARD

Turret Drills

Burg Tool Mfg. Co.—How the Burgmaster 2BH automatic, hydraulic, six-spindle turret drill and the eight-spindle model 3BH can increase production, improve quality and decrease handling costs is described in a 17-page brochure. The brochure also contains operating instructions and information on accessories.

FOR MORE DATA CIRCLE NO. 38 ON REPLY CARD

Electric Truck

Yale & Towne Mfg. Co.—Safety silhouette electric fork truck is described in detail and outstanding features illustrated in this 4-page booklet. Inside spread presents outstanding features of the model and illustrates design points of particular importance.

FOR MORE DATA CIRCLE NO. 39 ON REPLY CARD

Industrial Water Behavior

Hall Laboratories Inc. — Highlights of 30 years' devotion to solving problems related to procurement, treatment, use and disposal of industrial water have been condensed into a new 10-page booklet, "What Is Hall Laboratories?"

FOR MORE DATA CIRCLE NO. 40 ON REPLY CARD

Mesabi Screens

Pioneer Engineering Works Inc. —Mesabi vibrating screen is the

For free literature, editorial clips or more information on products described in this section, circle the corresponding number at left. Fill in box below for articles or advertisements not numbered.

ARTICLE OR ADVERTISEMENT	PAGE

NAME _____ TITLE _____

COMPANY _____

PRODUCTS MANUFACTURED _____

ADDRESS _____

1	11	21	31	41	51	61	71	81
2	12	22	32	42	52	62	72	82
3	13	23	33	43	53	63	73	83
4	14	24	34	44	54	64	74	84
5	15	25	35	45	55	65	75	85
6	16	26	36	46	56	66	76	86
7	17	27	37	47	57	67	77	87
8	18	28	38	48	58	68	78	88
9	19	29	39	49	59	69	79	89
10	20	30	40	50	60	70	80	90

FIRST CLASS
Permit No. 36
(Sec. 34.9 P.L.&R.)
CLEVELAND, OHIO

BUSINESS REPLY CARD

No Postage Stamp Necessary if Mailed in the United States

—POSTAGE WILL BE PAID BY—

STEEL

Penton Building

subject of a 16-page bulletin which emphasizes the strength and wearability of the redesigned screen. Structural features and operational characteristics are covered in detail. Screen capacity, size selection and installation are fully covered.

FOR MORE DATA CIRCLE NO. 41 ON REPLY CARD

Upright Drills

Western Machine Tool Works—Catalog No. 5415 covers the latest offering of 18-speed Western heavy-duty upright drills. These drills are made in three capacities. A summation of features is shown on page 10 of the catalog, with complete specifications on page 11.

FOR MORE DATA CIRCLE NO. 42 ON REPLY CARD

Mud Hog Crushers

Jeffrey Mfg. Co.—Bulletin 864 covers Jeffrey's mud hog crushers for reducing all types of wet, sticky materials. Crushers described are accompanied by general specifications and illustration. Other types of Jeffrey reduction machinery are illustrated and briefly described.

FOR MORE DATA CIRCLE NO. 43 ON REPLY CARD

Arc Welding

Bernard Welding Equipment Co.—This company offers a bulletin covering the Bernard-Arc slag-gas shielded welding. What it is, how it's applied automatically, semi-automatically, and welding current requirements are among the subjects covered. Six pages cover functions of equipment in detail.

FOR MORE DATA CIRCLE NO. 44 ON REPLY CARD

Standardized Fittings

Air Distribution Institute—Why and how standardized fittings offer a simple, successful key to higher dollar profit and greater sales volume on residential warm air heating and air conditioning jobs is explained in a brochure issued by the institute. The 8-page booklet emphasizes the profit-producing advantages, cost-cutting features and other important benefits resulting from the use of precision produced fittings.

FOR MORE DATA CIRCLE NO. 45 ON REPLY CARD

Ratchet-Lever Hoists

Coffing Hoist Co.—A bulletin on Safety-Pull ratchet lever hoists describes Coffing's entire line, including both roller and coil-chain models, with capacities ranging from ¾ to 15 tons. The 8-page bulletin illustrates the ratchet-pawl construction that eliminates friction brakes and the quick-disassembly feature of the coil-chain hoists.

FOR MORE DATA CIRCLE NO. 46 ON REPLY CARD

EDITORIAL REPRINTS:

To Plan Ahead

What's ahead for business in the second half? STEEL's editors put that question to 5000 metalworking executives. What your associates in industry think about economic prospects for the second six months of 1954 is summarized on pp. 55-58.

FOR MORE DATA CIRCLE NO. 47 ON REPLY CARD

Precipitation Hardening

First in a series of two articles on the subject of precipitation hardening begins on page 100 and takes up working stainless the easy way. Dr. A. L. Feild, Armco Steel Corp., says work them in the received condition, then harden with a minimum danger of scaling and distortion.

FOR MORE DATA CIRCLE NO. 48 ON REPLY CARD

Heat Treatment

"Below Zero Heat Treatment," page 104, describes the process and says it is being used on a production basis for a number of applications. These include transformation from austenite to martensite, normalizing castings, shrink fitting, etc.

FOR MORE DATA CIRCLE NO. 49 ON REPLY CARD

Exothermic Technique

Steelmakers long have been endeavoring to reduce the feeding factor (the weight of the feedhead to the total weight of the ingot ratio) to reduce production costs and increase furnace output. The exothermic technique for pouring ingots explained on page 111, does just that.

FOR MORE DATA CIRCLE NO. 50 ON REPLY CARD

BUSINESS REPLY CARD

No Postage Stamp Necessary if Mailed in the United States

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STEEL

Penton Building

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CLEVELAND, OHIO

1	11	21	31	41	51	61	71	81
2	12	22	32	42	52	62	72	82
3	13	23	33	43	53	63	73	83
4	14	24	34	44	54	64	74	84
5	15	25	35	45	55	65	75	85
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6-23-54

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ARTICLE OR ADVERTISEMENT — PAGE

NAME — TITLE

COMPANY

PRODUCTS MANUFACTURED

ADDRESS

CITY AND STATE

STEEL

June 28, 1954

Market Outlook

SLUGGISHNESS in the steel markets is intensified currently by approach of the Fourth of July holiday and widespread manufacturing curtailments for mass vacations. Impact of the latter will be felt over the next six weeks or so, with buying seen restricted to prompt needs.

By late summer, however, steelmakers are confident a substantial buying movement will get going, extending into fourth quarter as winter manufacturing schedules get into full swing.

OPTIMISM RULES— Generally, steel executives expect better business in last half than they entertained in the first six months. Some predict ingot operations will advance above 80 per cent of capacity before year end. If this proves true, it will represent a substantial rise considering the ingot rate averaged only about 71 per cent in the first half and at no time got above 75.3 per cent for any one month of the period.

Basis for improved sentiment in steel circles stems from the stronger position of the market in the light of liquidated consumer inventories.

METALWORKING SUPPORT— The views for last half held by steel executives find confirmation in metalworking circles generally. STEEL's midyear business outlook survey shows metalworking officials think the turning point in the economic adjustment is past, that the trend for second half of 1954 is upward.

Summarizing returns of a questionnaire sent 5039 metalworking executives, consensus for the last half is that: 1—Production volume will rise; 2—employment will pick up; 3—selling prices will be stable; 4—manufacturing costs will hold steady; 5—distribution costs will increase; 6—metalworking customers are increasing; 7—capacity will continue to expand; 8—more new products are planned.

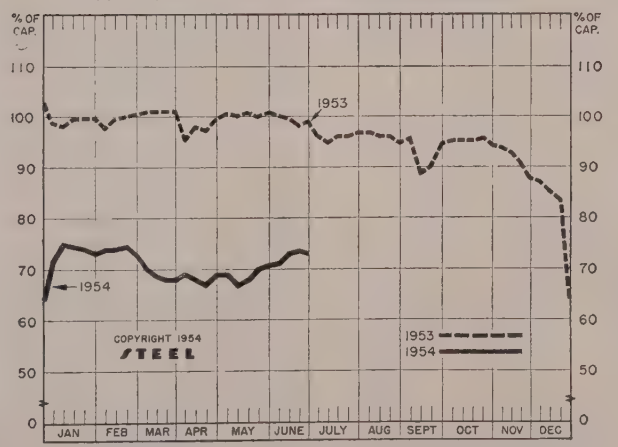
SEE GOOD YEAR— Of particular interest among the points developed in STEEL's survey is that 1954 will be metalworking's second largest year in sales with an estimated $113.1 billion. This is down about 10 per cent from 1953's $125.3 billion, but above any prior year.

PRODUCT DEMAND— Not much change in the various steel product markets has been in evidence for some weeks. Buying has been running along at sluggish pace except for slight quickening in some grades of sheets, notably galvanized, and noticeable pickup in cold-finished bar orders. Surprisingly, there has been little strike scare buying or hedging against a possible price increase. With a strike more imminent, now that the union has turned down the U.S. Steel offer, more protective purchasing may be experienced by warehouses.

PRICES— Considerable speculation prevails with respect to prices. There is some talk a general rise will follow any wage increase won by the steel union. Pending final settlement of negotiations, however, there is no way of telling steelmakers' price policy. In fact, considering the highly competitive conditions prevailing producers might have difficulty making a price increase stick at this time.

PRODUCTION—National ingot operations declined ½ point last week to 73 per cent of capacity, equal to about 1,740,000 net tons. A year ago 2,183,000 net tons were produced.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of capacity engaged)

	Week Ended June 27	Change	Same Week 1953	Same Week 1952
Pittsburgh	70	0	97.5	2
Chicago	83.5	0	103	7.5
Mid-Atlantic	57	- 2	98	16
Youngstown	72	0	105	0
Wheeling	87	+ 5	100	51.5
Cleveland	70	0*	98.5	0
Buffalo	67.5	0	106.5	0
Birmingham	76	- 2	101	0.5
New England	50	0	85	18
Cincinnati	69	— 2	104	32
St. Louis	73.5	+ 1	99	22
Detroit	71.5	- 3.5	105	37
Western	85	0	107	33
National Rate	73	— 0.5	99	12

INGOT PRODUCTION‡

	Week Ended June 27	Week Ago	Month Ago	Year Ago
INDEX (1947-1949=100)	107.8†	107.4	105.7	135.9
NET TONS (In thousands)	1,731	1,725	1,698	2,183

*Change from preceding week's revised rate. †Estimated. ‡Amer. Iron & Steel Institute. Weekly capacity (net tons): 2,384,549 in 1954; 2,254,459 in 1953; 2,077,040 in 1952.

The Metalworking Outlook—p. 47 Technical Outlook—p. 99

PRICE INDEXES AND COMPOSITES

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics) Week Ended June 22

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them write to STEEL.

Rails, standard, No. 1	$4.400	Bars, H.R., alloy	$8.575	Strip, C.R., stainless, 430 (lb)	$0.415
Rails, light, 40 lb	5.767	Bars, H.R., stainless, 303 (lb)	0.418	Strip, H.R., carbon	4.963
Tie Plates	5.125	Bars, H.R., carbon	4.873	Pipe, black, buttweld (100 ft)	14.454
Axles, railway	7.250	Bars, reinforcing	4.900	Pipe, galv., buttweld (100 ft)	17.731
Wheels, freight car, 33 in. (per wheel)	47.000	Bars, C.F., carbon	7.974	Pipe line (100 ft)	141.960
Plates, carbon	4.550	Bars, C.F., alloy	10.975	Casing, oil well, carbon (100 ft)	149.516
Structural Shapes	4.367	Bars, C.F., stainless, 302 (lb)	0.433	Casing, oil well, alloy (100 ft)	214.113
Bars, tool steel, carbon (lb)	0.415	Sheets, H.R., carbon	4.755	Tubes, boiler (100 ft)	‡
Bars, tool steel, alloy, oil hardening die (lb)	0.505	Sheets, C.R., carbon	5.696	Tubing, mechanical, carbon (100 ft)	‡
Bars, tool steel, H.R., alloy, high speed W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.60 (lb)	1.075	Sheets, galvanized	6.965	Tubing, mechanical, stainless, 304 (100 ft)	161.193
Bars, tool steel, H.R., alloy, high speed W 18, Cr 4, V 1 (lb)	1.550	Sheets, C.R., stainless, 302 (lb)	0.548	Tin plate, hot-dipped, 1.25 lb	$8.433
		Sheets, electrical	9.000	Tin plate, electrolytic, 0.25 lb	7.133
		Strip, C.R., carbon	7.229	Black plate, can making quality	6.233
				Wire, drawn, carbon	7.713
				Wire, drawn, stainless, 430 (lb)	0.545
				Bale ties (bundle)	5.653
				Nails, wire, 8d common	7.488
				Wire, barbed (80-rod spool)	6.847
				Woven wire fence (20-rod roll)	16.174

‡ Not available.

FINISHED STEEL PRICE INDEX (Bureau of Labor Statistics)

	June 22 1954	June 15 1954	Month Ago	May Average
(1947-1949=100)	140.9	140.9	140.8	140.8

STEEL's FINISHED STEEL PRICE INDEX*

	June 23 1954	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av.=100)	189.75	189.75	189.75	189.18	152.90
Index in cents per lb	5.140	5.140	5.140	5.125	4.142

STEEL's ARITHMETICAL PRICE COMPOSITES

	June 23 1954	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Finished Steel, NT*	$113.20	$113.20	$133.70	$114.84	$91.82
No. 2 Fdry, Pig Iron, GT	56.54	56.54	56.54	56.54	46.07
Basic Pig Iron, GT	56.04	56.04	56.04	56.04	45.60
Malleable Pig Iron, GT	57.27	57.27	57.27	57.27	47.27
Steelmaking Scrap, GT	27.83	27.83	28.33	40.50	21.25

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

COMPARISON OF PRICES

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	June 23 1954	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	4.15	4.15	4.15	4.15	3.35
Bars, H.R., Chicago	4.15	4.15	4.15	4.15	3.35
Bars, H.R., del. Philadelphia	4.405	4.405	4.405	5.302	3.816
Bars, C.F., Pittsburgh	5.20	5.20	5.20	5.20	3.95
Shapes, Std., Pittsburgh	4.10	4.10	4.10	4.10	3.25
Shapes, Std., Chicago	4.10	4.10	4.10	4.10	3.25
Shapes, del., Philadelphia	4.38	4.38	4.38	4.38	3.492
Plates, Pittsburgh	4.10	4.10	4.10	4.10	3.40
Plates, Chicago	4.10	4.10	4.10	4.10	3.40
Plates, Coatesville, Pa.	4.10	4.10	4.10	4.35	3.50
Plates, Sparrows Point, Md.	4.10	4.10	4.10	4.10	3.40
Plates, Claymont, Del.	4.10	4.10	4.10	4.55	3.50
Sheets, H.R., Pittsburgh	3.925	3.925	3.925	3.925	3.25
Sheets, H.R., Chicago	3.925	3.925	3.925	3.925	3.25
Sheets, C.R., Pittsburgh	4.775	4.775	4.775	4.775	4.00
Sheets, C.R., Chicago	4.775	4.775	4.775	4.775	4.00
Sheets, C.R., Detroit	4.975	4.975	4.975	4.975	4.20
Sheets, Galv., Pittsburgh	5.275	5.275	5.275	5.275	4.40
Strip, H.R., Pitts.	4.425	4.425	4.425	3.975-4.425	3.25
Strip, H.R., Chicago	3.925	3.925	3.925	3.925	3.25
Strip, C.R., Pittsburgh	5.45	5.45	5.45	5.45-5.95	4.375
Strip, C.R., Chicago	5.70	5.70	5.70	5.70	4.00
Strip, C.R., Detroit	5.65	5.65	5.65	5.45-6.05	4.20
Wire, Basic, Pitts.	5.525	5.525	5.525	5.475-5.525	4.15
Nails, Wire, Pittsburgh	6.55	6.55	6.55	6.35-6.55	5.15
Tin plate (1.50 lb), box, Pitts.	$8.95	$8.95	$8.95	$8.95	$7.75

SEMIFINISHED STEEL					
Billets, forging, Pitts (NT)	$75.50	$75.50	$75.50	$70.50	$61.00
Wire rods, 7/32-5/8" Pitts.	4.525	4.525	4.525	4.425	3.775

PIG IRON, Gross Ton	June 23 1954	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bessemer, Pitts.	$57.00	$57.00	$57.00	$57.00	$47.00
Basic, Valley	56.00	56.00	56.00	56.00	46.00
Basic, deld. Phila.	59.66	59.66	59.66	60.75	49.39
No. 2 Fdry, Pitts.	56.50	56.50	56.50	56.50	46.50
No. 2 Fdry, Chicago	56.50	56.50	56.50	56.50	46.25
No. 2 Fdry, Valley	56.50	56.50	56.50	56.50	46.50
No. 2 Fdry, del. Phila.	60.16	60.16	60.16	61.25	49.89
No. 2 Fdry, Birm.	52.88	52.88	52.88	52.88	39.38
No. 2 Fdry (Birm.) del. Cin.	60.43	60.43	60.43	60.43	45.13
Malleable, Valley	56.50	56.50	56.50	56.50	46.50
Malleable, Chicago	56.50	56.50	56.50	56.50	46.50
Ferromanganese, Duquesne.	200.00†	200.00†	200.00†	200.00†	175.00*

*75-82% Mn, gross ton, Etna, Pa. †74-76% Mn, net ton.

SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pitts.	$29.50	$29.50	$30.50	$42.50	$23.00
No. 1 Heavy Melt, E. Pa.	23.00	23.00	23.00	41.50	19.25
No. 1 Heavy Melt, Chicago	31.00	31.00	31.00	37.50	21.50
No. 1 Heavy Melt, Valley	28.50	29.50	29.50	45.50	22.00
No. 1 Heavy Melt, Cleve.	27.50	28.50	28.50	43.50	18.50
No. 1 Heavy Melt, Buffalo	26.50	26.50	25.50	40.75	19.75
Rails, Rerolling, Chicago	44.50	44.50	42.00	49.00	27.75
No. 1 Cast, Chicago	38.50	38.50	38.50	39.00	27.50

COKE, Net Ton					
Beehive, Furn, Connlsvl.	$14.75	$14.75	$14.75	$14.75	$13.50
Beehive, Fdry, Connlsvl.	16.75	16.75	16.75	17.00	16.25
Oven Fdry, Chicago	24.50	24.50	24.50	24.50	20.40

NONFERROUS METALS

(Cents per pound, carlots, except as otherwise noted)

PRIMARY METALS AND ALLOYS

Aluminum: 99+%, ingots 21.50, pigs 20.00, 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 12% Si, 23.30; No. 13, 5% Si, 23.10; No. 142, 4% Cu, 24.40; No. 195, 4.5% Cu, 0.8% Si, 23.70; No. 214, 3.8% Mg, 24.40; No. 356, 7% Si, 0.3% Mg, 23.20.

Antimony: R.M.M. brand, 99.5% 2S.50, Lone Star brand, 29.00, f.o.b. Laredo, Texas, in bulk. Foreign brands, 99.5%, 27.00-27.50 New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.50 per lb f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $72.75 per lb of contained Be, f.o.b. Reading, Pa.

Beryllium Copper: 3.75-4.25% Be, $40.00 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. Reading, Pa. or Elmore, O.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.70 per lb del.

Cobalt: 97-99%, $2.60 per lb for 550 lb keg; $2.62 per lb for 100 lb case; $2.67 per lb under 100 lb.

Columbium: Powder, $75.00 per lb, nom.

Copper: Electrolytic 30.00 del. Conn. Valley, 30.125 del. Midwest; Lake 30.00 del.; Fire refined 29.75 del.

Germanium: 99.9%, $295 per lb nom.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $145-$150 per troy oz.

Lead: Common 13.80, chemical 13.90, corroding 13.90, St. Louis; N. Y. basis, add 0.20.

Lithium: 98%, $11-$14 per lb, depending on quantity.

Magnesium: 99.8%, self-palletizing pig 27.00; notched ingot 27.75, 10,000 lb or more, f.o.b. Freeport, Tex. For Port Newark, N. J., and Madison, Ill., add 1.20 for pig and 1.25 for ingot. Sticks, 1.3 in. diameter, 46.00, 100 to 4999 lb, f.o.b. Madison, Ill.

Magnesium Alloys: AZ91C and alloys C, H, G and R 32.50; alloy M 34.50, 10,000 lb or more f.o.b. Freeport, Tex., or Madison, Ill. Add 1.20 for Port Newark, N. J.

Mercury: Open market, spot, New York, $270-$275, nom., per 76-lb flask.

Molybdenum: Powder 99% hydrogen reduced $3.40 per lb; pressed ingot $4.06 per lb; sintered ingot $5.53 per lb.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked 60.00; 25-lb pigs 62.65; "XX" nickel shot 63.65; "F" nickel shot or ingots for addition to cast iron, 60.00; prices

DAILY NONFERROUS PRICE RECORD

	Price June 23	Last Change	Previous Price	May Avg.	Apr. Avg.	June 1953 Avg.
Copper	30.00	Apr. 12	29.75-30.00	30.000	29.955	29.875
Lead	13.80	June 15	14.05	13.800	13.710	13.213
Zinc	11.00	June 3	10.50	10.290	10.250	11.000
Tin	94.625	June 23	94.00	93.600	96.260	92.918
Nickel	60.00	Jan. 14, 1953	56.50	60.000	60.000	60.000
Aluminum	21.50	July 15, 1953	20.50	21.500	21.500	20.500
Magnesium	27.00	Mar. 9, 1953	24.50	27.000	27.000	27.000

Quotations in cents per pound based on: Copper, del. Conn. Valley; Lead, common grade, del. St. Louis; Zinc, prime western, E. St. Louis; Tin, Straits, del. New York; Nickel, electrolytic cathodes, 99.9%, base size at refinery unpacked; Aluminum, primary ingots, 99 + %, del.; Magnesium 99.8%, Freeport, Tex.

f.o.b. Port Colborne, Ont., including import duty. New York basis, add 0.92.

Osmium: $140-$150 per troy oz nom.

Palladium: $21 per troy oz.

Platinum: $84-$87 per troy oz from refineries.

Radium: $16-$21.50 per mg radium content, depending on quantity.

Rhodium: $125 per troy oz.

Ruthenium: $75-$80 per troy oz.

Selenium: 99.5%, $5-$6 per lb.

Sodium: 16.50, carlots; 17.00 l.c.l

Tantalum: Sheet, rod $39.00 per lb; powder $33.50 per lb.

Tellurium: $1.75 per lb.

Thallium: $12.50 per lb.

Tin: Straits, N. Y., spot and prompt, 94.625.

Titanium: Sponge, 99.3+%, grade A-1 ductile (0.3% Fe max.) $4.72; grade A-2 (0.5% Fe max.) $4.46 per pound.

Tungsten: Powder, 98.8%, carbon reduced, 1000 lb lots $4.95 per lb f.o.b. shipping point; less than 1000 lb $5.10; 99+% hydrogen reduced, $4.65. Treated ingots $6.70.

Zinc: Prime Western 11.00, brass special 11.25, intermediate 11.50, E. St. Louis, freight allowed over 0.50 per pound. High grade 12.35, special high grade 12.50, die casting alloy ingot 15.00, del.

Zirconium: Sponge $10 per lb; powder electronics grade $15, flash grade $11.50.

(Note: Chromium, manganese and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingots: Piston Alloy 20.00-20.50; No. 12 foundry alloy (No. 2 grade) 19.25-19.75; 5% silicon alloy, 0.60 Cu max., 22.25-22.50; 13 alloy, 0.60 Cu max., 22.25-22.50; 195 alloy 21.00-21.50; 108 alloy 19.75-20.25; steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 20.00-20.50; grade 2, 19.00-19.50; grade 3, 18.00-18.50; grade 4, 17.00-17.50.

Brass Ingot: Red brass, No. 115, 27.00; tin bronze No. 225, 39.00; No. 245, 33.25; high-leaded tin bronze, No. 305, 31.50; No. 1 yellow, No. 405, 23.25; manganese bronze No. 421, 26.75.

Magnesium Alloy Ingot: AZ63A, 31.50; AZ91B, 27.00; AZ91C, 31.50; AZ92A, 31.50.

NONFERROUS MILL PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras 2000 to 5000 lb, f.o.b. Temple, Pa.; nominal 1.9% Be alloy) Strip, $1.68; rod, bar, wire, $1.65.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 100,000 lb lots, 35.36; 30,000 lb lots, 35.48; l.c.l. 35.98. Weatherproof, 100,000 lb, 36.28; 30,000 lb, 36.53; l.c.l. 37.03. Magnet wire del., 15,000 lb or more 41.83; l.c.l. 42.58.

LEAD

(Prices to jobbers f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more $19.00 per cwt; pipe, full coils $19.00 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheets, $15; sheared mill plate, $12; strip, $15; wire, $11; forging billets, $6; hot-rolled and forged bars, $6.

ZINC

(Prices per lb, c.l., f.o.b. mill) Sheets 23.00, ribbon zinc in coils, 18.50-20.50; plates 18.00-22.25.

ZIRCONIUM

Plate $27; H.R. strip $28; C.R. strip $35; forged or H.R. bars $27; wire, 0.015 in., 1 cent per linear foot.

	NICKEL, "A" Nickel	MONEL, Monel	INCONEL, Inconel
Sheet, C.R. ...	86.5	67.5	92.5
Strip, C.R. ...	92.5	70.5	98.5
Plate, H.R. ...	84.5	66.5	90.5
Rod, Shapes ..	82.5	65.5	88.5
Seamless Tubes	115.5	100.5	137.5
Shot, Blocks ..	....	60.0	....

ALUMINUM

(30,000 lb base; freight allowed over 499 lb) Sheets and Circles: 2S and 3S mill finish c.l.

Thickness Range Inches	Widths or Diameters, In., Inc.	Flat Sheet*	Coiled Sheet	Coiled Sheet Circle†
0.249-0.136	12-49	33.9	...	...
0.135-0.096	12-48	34.4	...	...
0.095-0.077	12-48	35.1	32.7	37.5
0.076-0.061	12-48	35.7	32.9	37.7
0.060-0.048	12-48	36.1	33.2	38.1
0.047-0.038	12-48	36.6	33.6	38.4
0.037-0.030	12-48	37.0	34.0	39.1
0.029-0.024	12-48	37.6	34.3	39.6
0.023-0.019	12-36	38.3	35.1	40.4
0.018-0.017	12-36	39.1	35.7	41.3
0.016-0.015	12-36	40.0	36.5	42.5
0.014	12-24	41.0	37.5	43.8
0.013-0.012	12-24	42.1	38.2	44.8
0.011	12-24	43.1	39.4	46.4
0.010-0.0095	12-24	44.3	40.5	48.0
0.009-0.0085	12-24	45.6	41.9	50.0
0.008-0.0075	12-24	47.1	43.1	51.8
0.007	12-18	48.6	44.6	54.1
0.006	12-18	50.2	46.0	59.1

* 72-180 in. lengths. † 26 in. max. dia.

ALUMINUM

Plates and Circles: Thickness 0.250-3.0 in., 24-60 in. width or dia., 72-240 in. lengths.

Alloy	Plate Base	Circle Base
2S-F, 3S-F	32.4	36.3
50S-F	33.5	37.4
4S-F	34.5	39.1
52S-F	36.2	40.9
61S-T6	37.4	41.5
24S-T4*	39.3	45.4
75S-T6*	47.1	53.7

*24-48 in. widths or dia., 72-180 in. lengths.

ALUMINUM

Screw Machine Stock: 5000 lb and over.

Dia. (in.) or across flats	——Round—— 11S-T3	17S-T4	—Hexagonal— 11S-T3	17S-T4
Drawn				
0.125	59.6	57.9	...	...
0.156-0.172	50.6	48.9	...	...
0.188	50.6	48.9	...	62.4
0.219-0.234	47.9	46.2	...	...
0.250-0.281	47.9	46.2	...	59.5
0.313	47.9	46.2	...	56.8
Cold-finished				
0.375-0.531	46.6	44.9	56.2	53.4
0.563-0.688	46.6	44.9	53.4	50.2
0.750-1.000	45.5	43.8	48.9	47.3
1.063	45.5	43.8	...	45.7
1.125-1.500	43.8	42.1	47.3	45.7
Rolled				
1.563	42.7	41.0	...	...
1.625-2.000	42.1	40.4	...	44.1
2.125-2.500	41.1	39.4	...	...
2.750-3.375	39.9	38.2	...	...

ALUMINUM

Forging Stock: Round, Class 1, 43.8-34.4, in specific lengths 36-144 in., diameters 0.375-8 in.; rectangles and squares. Class 1, 50.2-38.4 in random lengths 0.375-4.0 in. thick, widths 0.750-10.0 in.

Pipe: A.S.A. Schedule 40, alloy 63S-T6, 20 ft length, plain ends, 90,000 lb base, per 100 ft.

Nom. pipe size, in.		Nom. pipe size, in.	
¾	$15.05	2	$ 46.30
1	23.65	4	127.70
1¼	32.00	6	228.50
1½	38.25	8	343.80

MAGNESIUM

Sheet: AZ31, commercial grade, 0.032-in. 94.00, 0.064-in. 73.00, 0.125-in. 60.00, 30,000 lb and over, f.o.b. mill.

Plate: Hot-rolled AZ31, 53.00, 20,000 lb or more 0.250-in. and over, widths to 48 in., lengths to 144 in.; raised pattern floor plate, 59.00, 20,000 lb or more, ¼-in. thick, widths 24-72 in , lengths 60-192 in.

Extrusion Stock: AZ31, Rectangles, ¼ x 2 in. 69.20, 1 x 4 in. 63.00. Rod, 1 in. 66.00, 2 in. 62.50. Tubing, 1 in. OD x 0.065-in. 87.00. Angles, 1 x 1 x ⅛-in. 72.90, 2 x 2 x ¼-in. 67.00. Channels, 5 in. 67.80. I-Beams, 5 in. 66.20.

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES f		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tube	Clean Heavy	Rod Ends	Clean Turnings
Copper	48.38b	45.98c	....	48.44	26.000	26.000	25.250
Yellow Brass	41.72	34.50d	42.26	44.63	19.750	19.500	18.000
Red Brass, 85%	45.44	45.38	45.98	48.25	23.000	22.750	22.250
Low Brass, 80%	44.47	44.41	45.01	47.28	22.125	21.875	21.375
Naval Brass	45.76	40.07	52.82	48.92	18.250	18.000	17.500
Commercial Bronze, 90% ...	46.95	46.89	47.49	49.51	23.875	23.625	23.125
Nickel Silver, 10%	55.36	59.43g	57.69	....	23.625	23.375	11.813
Phosphor Bronze, A, 5% ...	66.58	67.08	67.08	68.23	26.125	25.875	24.875
Silicon Bronze	52.71	51.90	52.75	70.11e	25.125	24.875	24.125
Manganese Bronze	49.48	43.62	54.06	....	18.250	18.000	17.500
Muntz Metal	43.96	39.77	....	....	18.625	18.375	17.875

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 pounds, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. g. Leaded.

NONFERROUS SCRAP

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots)

Aluminum: 2S clippings 13.00; low copper clippings 13.00; mixed clippings 11.00; old sheet 10.00; borings and turnings 6.00; pistons and struts 7.50; crankcases 10.00; industrial castings 10.00.

Copper and Brass: Heavy copper and wire, No. 1 24.50-25.00; No. 2 copper 23.00-23.50; light copper 21.00-21.50; No. 1 composition red brass 19.00-19.50; No. 1 composition turnings 18.50-19.00; mixed brass turnings 11.50-12.00; new brass clippings 18.00; No. 1 brass rod turnings 15.00; light brass 11.50-12.00; heavy yellow brass 14.00; new brass rod ends 16.00; auto radiators, unsweated 15.00; cocks and faucets 16.00-16.50; brass pipe 16.50-17.00.

Lead: Heavy 11.00-11.25; battery plate 5.75-6.00; linotype and stereotype 13.00; electrotype 11.50; mixed babbitt 12.00-12.50.

Magnesium: Clippings 18.50-19.50; clean castings 17.50-18.50; iron castings, not over 10% removable Fe, 16.50-17.50.

Monel: Clippings 23.00-25.00; old sheet 21.00-23.00; turnings 16.00-18.00; rods 23.00-25.00.

Nickel: Sheets and clips 60.00-65.00; rolled anodes 60.00-65.00; turnings 40.00; rod ends 60.00-65.00.

Tin: No. 1 pewter 55.00-60.00; block tin pipe 75.00-80.00; No. 1 babbitt 50.00.

Zinc: Old zinc, 4.75-5.00; new die cast scrap, 4.50-4.75; old die cast scrap, 3.00-3.25.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 2S, 3S clippings 14.75-15.25; 51S, 52S clippings 14.75-15.25; 14S, 17S, 24S clippings 14.00-14.50; mixed clippings 13.00-13.50; old sheet 12.00-12.50; old cast 12.00-12.50; clean old cable, free of steel 14.50-15.00; borings and turnings 12.50-13.00.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 42.00; light scrap 37.00.

Copper, Brass: No. 1 copper 27.00-27.25; No. 2 copper 25.50-25.75; light copper 24.00-24.25; refinery brass (60% copper) per dry copper content 22.75-23.00.

INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper, Brass, No. 1 copper 27.00-27.25; No. 2 copper 25.50-25.75; light copper 24.00-24.25; No. 1 composition borings 20.50; No. 1 composition solids 21.50; heavy yellow brass solids 16.50; yellow brass turnings 16.00; radiators 17.50-17.75.

PLATING MATERIALS

(F.o.b. shipping points, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes $1.70 per lb.

Copper: Flat-rolled 45.04, oval 44.54, 2000-5000 lb; electrodeposited 39.78, cast 42.04, 5000-10,000 lb lots.

Nickel: Depolarized, less than 500 lb 92.00; 500-4999 lb 88.00; over 5000 lb 86.00.

Tin: Bar or slab, less than 200 lb $1.125; 200-499 lb $1.11; 500-999 lb $1.105; 1000 lb or more $1.10.

Zinc: Bar 18.50, bar or flat top 17.50, ton lots.

CHEMICALS

Cadmium Oxide: $2.15 per lb, in 100 lb drums.

Chromic Acid: Less than 10,000 lb 28.50; over 10,000 lb 27.50.

Copper Cyanide: Under 1000 lb 63.90, 1000 lb and over 61.90.

Copper Sulphate: 100-6000 lb 11.35; 6000-12,000 lb 11.10; 12,000-24,000 lb 10.85; 24,000-36,000 lb 10.60; 36,000 lb and over 10.35.

Nickel Chloride: 100 lb 45.00; 200 lb 43.00; 300 lb 42.00; 400-4900 lb 40.00; 5000-9900 lb 38.00; 10,000 lb and over 37.00.

Nickel Sulphate: 100 lb 37.00; 200 lb 35.00; 300 lb 34.00; 400-4900 lb 32.00; 5000-35,000 lb 30.00; 36,000 lb and over 29.00.

Silver Cyanide: Cents per ounce, 16 oz 80.625; 100 oz 78.50; 25,000 oz and over 77.325.

Sodium Cyanide: Egg, under 1000 lb 19.80; 1000-19,900 lb 18.80; 20,000 lb and over 17.80; granular, add 1-cent premium to above.

Sodium Stannate: Less than 100 lb 71.5; 100-600 lb 52.2; 700-1900 lb 54.7; 2000-9900 lb 53; 10,000 lb or more 51.9.

Stannous Chloride (Anhydrous): Less than 50 lb $1.576; 50 lb $1.236; 100-300 lb $1.086; 400-900 lb $1.061; 1000-1900 lb $1.037; 200-4900 lb $1; 5000-19,000 lb 93.9; 20,000 lb and over 87.8.

Stannous Sulphate: Less than 5 lb $1.275; 50 lb 97.5; 100-1900 lb 95.5; 2000 lb and over 93.5.

Zinc Cyanide: Under 1000 lb 54.30, 1000 lb and over 52.30.

Nonferrous Metals

Outlook for nonferrous foundries for 1954 depends on the expected fall upturn. Business thus far has been well down from last year. Favorable signs are appearing

NONFERROUS foundries rallied in March of this year out of the almost constant decline in shipments which began early last year (see accompanying table). But they still have the seasonal mid-summer slump to look forward to, and the March rally was mostly at the expense of backlogs.

So most nonferrous foundrymen do not look for a sustained upturn in business until fall. That hoped-for fall upswing will tell the tale of how well 1954 shipments match up to last year's.

Two Tales—Based on first quarter, 1954, shipments could well wind up 20 to 30 per cent behind 1953, with magnesium and copper alloy castings accounting for much of the drop. For first quarter, 1954, copper and copper alloy casting shipments were down 18 per cent from first quarter of the year before, aluminum casting shipments were down 7 per cent and magnesium casting shipments were down 27 per cent. Shipments for over-all 1954 could also wind up less than 20 per cent off the 1953 pace if some of the favorable portents become actual sales.

From the East, William L. Leopold, Northern Bronze Corp., Philadelphia, says his company is looking for a slow increase over the rest of the year. Business is holding up fairly well from valve and steam specialty houses though textile machinery business is depressed and defense work is nominal. Also from the East, marine and aircraft business is off substantially.

Hop-Skotching — G. N. Wright, Harsch Bronze & Aluminum Co., Cleveland, says his company will probably be ahead of last year. But that's due to specialized aluminum casting business. Other than that, the defense market is pretty dead, appliance markets are off drastically and farm machinery buyers must be down on the farm—they're not in the castings' market.

From Chicago comes the first glimmer of optimism. The Nonferrous Founders' Society Inc., Chicago, reports this comment from that city: "Considerable improvement in the last 30 days." Much of that work is for farm equipment. And from the West Coast, a June report says stepped-up planemakers' orders have boosted sales for magnesium castings more than 15 per cent since January. Defense work accounts for 60 per cent of magnesium casting total output, but commercial sales are holding up too.

Shipments of Nonferrous Castings*

(Thousands of pounds)

	Copper & Copper Alloy	Aluminum	Magnesium
1954			
Mar.	76,354	56,151	2,407
Feb.	68,849	51,213	2,198
Jan.	71,437	51,446	2,451
1953			
Dec.	77,669	52,025	2,685
Nov.	74,712	51,405	2,677
Oct.	83,661	55,438	3,015
Sept.	80,307	53,694	2,524
Aug.	78,357	50,900	2,559
July	71,041	51,653	2,372
June	84,656	56,820	3,136
May	85,223	57,602	2,679
Apr.	94,362	61,582	3,294
Mar.	92,798	59,423	3,362
Feb.	85,183	54,864	3,225
Jan.	85,781	55,629	3,073

* For Zinc see STEEL, May 31, p. 57.

Could Be Good—Nonferrous foundries, being ancillary suppliers, cannot sell castings to industries that are themselves in the doldrums. Reports of increased aircraft and farm equipment work are encouraging since that means those industries are becoming more active. The work might spread eastward. Defense work, currently down to fractions of a per cent of output in many shops, would give nonferrous foundries another boost if expected new spending materializes (see STEEL, June 14, p. 68). Any activity in the marine field would be a big improvement.

Statistically the fall-off in nonferrous shipments has hit foundries like this: Number of production workers fell from 82,200 in January, 1953, to 69,200 in January, 1954; the average workweek dropped from 42.7 hours to 39.9 hours during the same period. Some 566 nonferrous foundries over the country employ 20 or more persons each: 323 employ 20 to 49; 112 employ 50 to 99; 88 employ 100 to 249; and 43 employ 500 or more.

STEEL's sales planning guide, "Metalworking Markets in the U.S.," shows those nonferrous foundries are concentrated in Ohio, Pennsylvania and Illinois. Next most heavy concentrations are in Michigan, New York and California. Other states in the east and north central parts of the U.S. are also important in this field.

Markets Calm and Steady

Nonferrous markets were fairly calm over the past week with prices riding on a flat level. Even the stockpile buying of lead and zinc by General Services Administration did little to rile trading waters.

Policy clarification by GSA that lead and zinc buying for stockpile would be at the market price opened the door for some buying, reportedly in quantities from "fairly good" to "nominal." GSA is apparently allocating this buying among sellers by buying a percentage of the metal offered from the various sources.

Zinc traders reported a slight improvement in buying from galvanizers and a flurry in futures for December, April and May.

Lead sellers indicate GSA may have bought as much as 8000 tons of the metal for stockpile which was moving at 14.00c per pound for common grade delivered, St. Louis. Producers' stocks are about 100,000 tons.

Slow-down in copper scrap buying was attributed mainly to sharply reduced purchases by Japan and Italy last week. Whether these sources begin buying again depends on the dollar supply in the case of Japan and how far and how fast the defense build-up will continue in the case of European buyers. The trade in primary copper was good over the week and the price remained firm.

Probably the loudest nonferrous activity during the week came from Washington. There, Rep. Melvin Price (Dem., Ill.) outlined a program of "relief" for the lead, zinc and copper mining and smelting industries. Rep. Price's immediate program for aid calls for extension of the Defense Production Act beyond June 30, 1954; federal aid to states' unemployment compensation; increased tax exemptions; distressed-area assistance and increased stockpiling of the three metals at prices which will enable most mines to open and operate profitably.

WANTED... CUSTOMERS FOR KEEPS

Newport Steel

As a regular customer you will be at all times an integral part of Newport Steel's operation, with first claim upon the output of these modern facilities, and with a guarantee of prompt delivery. From steelmaking furnaces to final rolling, Newport fosters your order just the way you would, meeting all requirements for quality and delivery. Greatly improved facilities, a strict policy of first obligation to regular customers, and convenient location in the nation's fastest growing industrial area, make Newport a reliable source for exceptional steel. Let us demonstrate how well we can produce for you!

ECONOMICAL WATERAIL DELIVERY

Newport Steel is situated on the Mississippi-Ohio River system and the great Cincinnati rail hub. With the advantage of location, new river barge facilities and seven major railroads, Newport gives economical, dependable delivery to industrial areas throughout the Middle West and South.

PRODUCTS OF NEWPORT STEEL

- Hot-Rolled Steel in Coil
- Hot-Rolled Pickled Steel in Coil
- Electric Weld Line Pipe
- Hot-Rolled Sheets
- Galvanized Sheets
- Galvannealed Sheets
- Colorbond Sheets
- Hot-Rolled Pickled Sheets
- Electrical Sheets
- Alloy Sheets and Plates
- Roofing and Siding
- Eave Trough and Conductor Pipe
- Culverts

Newport Steel

CORPORATION

NEWPORT, KENTUCKY

STEEL PRICES

Mill prices as reported to STEEL, cents per pound except as otherwise noted. Changes shown in italics.
Code numbers following mill points indicate producing company; key on page 155. Key to footnotes, page 157.

SEMIFINISHED

INGOTS, Carbon Forging (NT)

Fontana,Calif. K1 ....$86.00
Munhall,Pa. U5 .....59.00

INGOTS, Alloy (NT)

Detroit R7 .....$63.00
Fontana,Calif. K1 ....88.00
Midland,Pa. C18 .....62.00
Munhall,Pa. U5 .....62.00

BILLETS, BLOOMS & SLABS
Carbon Rerolling (NT)

Aliquippa,Pa. J5 ....$62.00
Bessemer,Pa. U5 .....62.00
Clairton,Pa. U5 .....62.00
Ensley,Ala. T2 .....62.00
Fairfield,Ala. T2 .....62.00
Fontana,Calif. K1 ....70.00
Gary,Ind. U5 .....62.00
Johnstown,Pa. B2 ....62.00
Lackawanna,N.Y. B2 ..62.00
Munhall,Pa. U5 .....62.00
So.Chicago,Ill. U5 ....62.00
So.Duquesne,Pa. U5 ..62.00

Carbon, Forging (NT)

Aliquippa,Pa. J5 ....$75.50
Bessemer,Pa. U5 .....75.50
Buffalo R2 .....75.50
Clairton,Pa. U5 .....75.50
Cleveland R2 .....75.50
Conshohocken,Pa. A3 ..80.50
Detroit R7 .....78.50
Ensley,Ala. T2 .....75.50
Fairfield,Ala. T2 .....75.50
Fontana,Calif. K1 ....83.50
Gary,Ind. U5 .....75.50
Geneva,Utah C11 ....75.50
Houston S5 .....83.50
Johnstown,Pa. B2 ....75.50
Lackawanna,N.Y. B2..75.50
LosAngeles B3 .....85.00
Munhall,Pa. U5 .....75.50
Seattle B3 .....89.00
So.Chicago R2,U5,W14..75.50
So.Duquesne,Pa. U5 ..75.50
So.SanFrancisco B3 ...85.00

Alloy, Forging (NT)

Bethlehem,Pa. B2 ....$82.00
Buffalo R2 .....82.00
Canton,O. R2, T7 ....82.00
Conshohocken,Pa. A3 ..89.00
Detroit R7 .....84.00
Fontana,Calif. K1 ....101.00
Gary,Ind. U5 .....82.00
Houston S5 .....90.00
Ind.Harbor,Ind. Y1 ....82.00
Johnstown,Pa. B2 ....82.00
Lackawanna,N.Y. B2 ..82.00
LosAngeles B3 .....102.00
Massillon,O. R2 .....82.00
Midland,Pa. C18 .....82.00
Munhall,Pa. U5 .....82.00
So.Chicago R2,U5,W14..82.00
So.Duquesne,Pa. U5 ..82.00
Struthers,O. Y1 .....82.00
Warren,O. C17 .....82.00

ROUNDS, SEAMLESS TUBE (NT)

Buffalo R2 .....$92.50
Canton,O. R2 .....92.50
Cleveland R2 .....92.50
Fontana,Calif. K1 ....113.50
Gary,Ind. U5 .....92.50
Massillon,O. R2 .....92.50
So.Chicago,Ill. R2 ....92.50
So.Duquesne,Pa. U5 ..92.50

SHEET BAR (NT)

Fontana,Calif. K1 ...$93.18

SKELP

Aliquippa,Pa. J5 .....3.85
Munhall,Pa. U5 .....3.75
Warren,O. R2 .....3.75
Youngstown R2, U5 ....3.75

WIRE RODS

AlabamaCity,Ala. R2 ..4.525
Aliquippa,Pa. J5 .....4.525
Alton,Ill. L1 .....4.70
Buffalo W12 .....4.525
Cleveland A7 .....4.525
Donora,Pa. A7 .....4.525
Fairfield,Ala. T2 .....4.525
Fontana,Calif. K1 ....5.325
Houston S5 .....4.925
Johnstown,Pa. B2 .....4.525
Joliet,Ill. A7 .....4.525
KansasCity,Mo. S5 ....4.865
Kokomo,Ind. C16 ....4.625
LosAngeles B3 .....5.325
Minnequa,Colo. C10 ..4.775
Monessen,Pa. P7 .....4.525
No.Tonawanda,N.Y.B11 4.525
Pittsburg,Calif. C11 ..5.175
Portsmouth P12 .....4.525
Roebling,N.J. R5 ....4.625
So.Chicago,Ill. R2 ....4.525
SparrowsPoint,Md. B2..4.625
Sterling,Ill.(1) N15 ...4.525
Struthers,O. Y1 .....4.525
Torrance,Calif. C11 ...5.325
Worcester,Mass. A7 ..4.825

STRUCTURALS

Carbon Steel Stand. Shapes

AlabamaCity,Ala. R2 ...4.10
Aliquippa,Pa. J5 .....4.10
Bessemer,Ala. T2 .....4.10
Bethlehem,Pa. B2 .....4.15
Clairton,Pa. U5 .....4.10
Fairfield,Ala. T2 .....4.10
Fontana,Calif. K1 ....4.75
Gary,Ind. U5 .....4.10
Geneva,Utah C11 .....4.10
Houston S5 .....4.50
Ind.Harbor,Ind. I-2 ...4.10
Johnstown,Pa. B2 .....4.15
KansasCity,Mo. S5 .....4.70
Lackawanna, N.Y. B2 ..4.15
LosAngeles B3 .....4.80
Minnequa, Colo. C10 ....4.55
Munhall,Pa. U5 .....4.10
Niles,Calif. P1 .....4.80
Phoenixville,Pa. P4 ....3.80
Seattle B3 .....4.85
So.Chicago,Ill. U5, W14.4.10
So.SanFrancisco B3 ....4.75
Torrance,Calif. C11 ....4.80
Weirton,W.Va. W6 ....4.10

Wide Flange

Bethlehem,Pa. B2 .....4.15
Clairton,Pa. U5 .....4.10
Fontana,Calif. K1 ....5.10
Lackawanna,N.Y. B2 ..4.15
Munhall,Pa. U5 .....4.10
Phoenixville,Pa. P4 ....3.80
So.Chicago,Ill. U5 ....4.10

Alloy Stand. Shapes

Clairton,Pa. U5 .....5.00
Fontana,Calif. K1 .....6.40
Gary,Ind. U5 .....5.00
Munhall,Pa. U5 .....5.00
So.Chicago,Ill. U5 .....5.00

H.S., L. A. Stand. Shapes

Aliquippa,Pa. J5 .....6.175
Bessemer,Ala. T2 ....6.175
Bethlehem,Pa. B2 ....6.20
Clairton,Pa. U5 .....6.175
Fairfield,Ala. T2 .....6.175
Fontana,Calif. K1 ....6.825
Gary,Ind. U5 .....6.175
Geneva,Utah C11 .....6.175
Ind.Harbor,Ind. I-2 ...6.175
Ind.Harbor,Ind. Y1 ...6.675
Johnstown,Pa. B2 .....6.20
Lackawanna,N.Y. B2 ..6.20
LosAngeles B3 .....6.85
Munhall,Pa. U5 .....6.175
Seattle B3 .....6.90
So.Chicago,Ill. U5,W14,.6.175
So.SanFrancisco B3 ....6.80
Struthers,O. Y1 .....6.675

H.S., L. A. Wide Flange

Bethlehem,Pa. B2 .....6.20
Lackawanna,N.Y. B2 ...6.20
Munhall,Pa. U5 .....6.125
So.Chicago,Ill. U5 ....6.125

PILING

Bearing Piles

Munhall,Pa. U5 .....4.10
So.Chicago,Ill. U5 .....4.10

STEEL SHEET PILING

Ind.Harbor,Ind. I-2 ...4.925
Lackawanna,N.Y. B2 ..4.925
Munhall,Pa. U5 .....4.925
So.Chicago,Ill. U5 ....4.925

PLATES

PLATES, Carbon Steel

AlabamaCity,Ala. R2 ..4.10
Aliquippa,Pa. J5 .....4.10
Ashland,Ky.(15) A10 ..4.10
Bessemer,Ala. T2 .....4.10
Clairton,Pa. U5 .....4.10
Claymont,Del. C22 ....4.10
Cleveland J5, R2 .....4.10
Coatesville,Pa. L7 .....4.10
Conshohocken,Pa. A3 ..4.10
Ecorse,Mich. G5 .....4.25
Fairfield,Ala. T2 .....4.10
Fontana,Calif.(30) K1 ..4.75
Gary,Ind. U5 .....4.10
Geneva,Utah C11 .....4.10
GraniteCity,Ill. G4 ....4.30
Harrisburg,Pa. C5 ....3.85
Houston S5 .....4.50
Ind.Harbor,Ind. I-2, Y1.4.10
Johnstown,Pa. B2 .....4.10
Lackawanna,N.Y. B2 ..4.10
LoneStar,Tex. L6 .....4.40
Minnequa,Colo. C10 ....4.95
Munhall,Pa. U5 .....4.10
Pittsburgh J5 .....4.10
Riverdale,Ill. A1 .....4.10
Seattle B3 .....5.00
Sharon,Pa. S3 .....4.10
So.Chicago,Ill. U5, W14.4.10
SparrowsPoint,Md. B2 ..4.10
Steubenville,O. W10 ....4.10
Warren,O. R2 .....4.10
Weirton,W.Va. W6 ....4.10
Youngstown R2, U5, Y1.4.10

PLATES, Carbon Abras. Resist.

Fontana,Calif. K1 ....5.90
Geneva,Utah C11 .....5.25

PLATES, Wrought Iron

Economy,Pa. B14 .....9.30

PLATES,High-Strength Low-Alloy

Aliquippa,Pa. J5 .....6.25
Bessemer,Ala. T2 .....6.25
Clairton,Pa. U5 .....6.25
Cleveland J5 .....6.25
Conshohocken,Pa. A3 ..6.25
Ecorse,Mich. G5 .....6.40
Fairfield,Ala. T2 .....6.25
Fontana,Calif(30) K1 ..6.95
Gary,Ind. U5 .....6.25
Geneva,Utah C11 .....6.25
Ind.Harbor,Ind. I-2 ....6.25
Ind.Harbor,Ind. Y1 ....6.75
Johnstown,Pa. B2 .....6.25
Lackawanna,N.Y. B2 ..6.25
Munhall,Pa. U5 .....6.25
Pittsburgh J5 .....6.25
Seattle B3 .....7.15
Sharon,Pa. S3 .....6.25
So.Chicago,Ill. U5, W14.6.25
SparrowsPoint,Md. B2 ..6.25
Youngstown U5 .....6.25
Youngstown Y1 .....6.75

PLATES, Alloy

Claymont,Del. C22 ....5.55
Coatesville,Pa. L7 .....5.55
Fontana,Calif. K1 .....6.60
Gary,Ind. U5 .....5.55
Johnstown,Pa. B2 .....5.55
Munhall,Pa. U5 .....5.55
Sharon,Pa. S3 .....5.55
So.Chicago,Ill. U5, W14.5.55
SparrowsPoint,Md. B2 ..5.55

FLOOR PLATES

Cleveland J5 .....5.15
Conshohocken,Pa. A3 ...5.15
Harrisburg,Pa. C5 .....5.15
Ind.Harbor,Ind. I-2 ....5.15
Munhall,Pa. U5 .....5.15
So.Chicago,Ill. U5 .....5.15

PLATES, Ingot Iron

Ashland c.l. (15) A10 ..4.35
Ashland l.c.l. (15) A10..4.85
Cleveland c.l. R2 .....4.70
Warren,O. c.l. R2 .....4.70

BARS

BARS, Hot-Rolled Carbon

Aliquippa,Pa. J5 .....4.15
Alton,Ill. L1 .....4.35
Atlanta,Ga. A11 .....4.35
Bessemer,Ala. T2 .....4.15
Birmingham,Ala. C15 ..4.15
Buffalo(31) R2 .....4.18
Chicago(31) R2 .....4.22
Clairton,Pa. U5 .....4.15
Cleveland(31) R2 .....4.21
Detroit R7 .....4.30
Ecorse,Mich. G5 .....4.30
Emeryville,Calif. J7 ....4.90
Fairfield,Ala. T2 .....4.15
Fairless,Pa. U5 .....4.30
Fontana,Calif. K1 .....4.85
Gary,Ind. U5 .....4.15
Gadsden,Ala.(31) R2 ...4.18
Houston S5 .....4.55
Ind.Harbor,Ind. I-2, Y1.4.15
Johnstown,Pa. B2 .....4.15
KansasCity,Mo. S5 .....4.75
Lackawanna,N.Y. B2 ..4.15
LosAngeles B3 .....4.85
Milton,Pa. M18 .....4.15
Minnequa,Colo. C10 ....4.60
Niles,Calif. P1 .....4.85
N.Tonawanda,N.Y. B11 4.15
Pittsburg,Calif. C11 ....4.85
Pittsburgh J5 .....4.15
Portland,Oreg. O4 .....4.90
Seattle B3, N14, P23 ...4.90
So.Chicago U5, W14 ...4.15
So.Duquesne,Pa. U5 ...4.15
So.SanFran.,Calif. B3 ..4.90
Sterling,Ill. (1) N15 ...4.15
Struthers,O. Y1 .....4.15
Torrance,Calif. C11 ....4.85
Weirton,W.Va. W6 ....4.15
Youngstown U5 .....4.15
Youngstown(31) R2 ....4.20

Bars, Hot-Rolled Alloy

Bethlehem,Pa. B2 ....4.875
Buffalo R2 .....4.875
Canton,O. R2, T7 ....4.875
Clairton,Pa. U5 .....4.875
Detroit R7 .....4.975
Ecorse,Mich. G5 .....5.025
Fairless,Pa. U5 .....5.025
Fontana,Calif. K1 ....5.925
Gary,Ind. U5 .....4.875
Houston S5 .....5.275
Ind.Harbor,Ind. I-2,Y1.4.875
Johnstown,Pa. B2 ....4.875
KansasCity,Mo. S5 ....5.475
Lackawanna,N.Y. B2 ..4.875
LosAngeles B3 .....5.925
Massillon,O. R2 .....4.875
Midland,Pa. C18 .....4.875
So.Chicago R2,U5,W14.4.875
So.Duquesne,Pa. U5 ...4.875
Struthers,O. Y1 .....4.875
Warren,O. C17 .....4.875
Youngstown U5 .....4.875

BARS & SMALL SHAPES, H.R.
High-Strength Low-Alloy

Aliquippa,Pa. J5 .....6.225
Bessemer,Ala T2 ....6.225
Bethlehem,Pa. B2 ....6.225
Clairton,Pa. U5 .....6.225
Ecorse,Mich. G5 .....6.375
Fairfield,Ala. T2 .....6.225
Fontana,Calif. K1 ....7.475
Gary,Ind. U5 .....6.225
Ind.Harb.,Ind. Y1 ....6.725
Ind.Harb.,Ind. I-2 ....6.225
Johnstown,Pa. B2 .....6.225
Lackawanna,N.Y. B2 ..6.225
LosAngeles B3 .....6.925
Pittsburgh J5 .....6.225
Seattle B3 .....6.975
So.Chicago W14 .....6.225
So.Duquesne,Pa. U5 ...6.225
So.SanFrancisco B3 ..6.975
Struthers,O. Y1 .....6.725
Youngstown U5 .....6.225

BAR SIZE ANGLES; H.R.CARBON

Bethlehem.Pa. B2 .....4.35

BAR SIZE ANGLES; S. Shapes

Aliquippa,Pa. J5 .....4.15
Atlanta A11 .....4.35
Niles,Calif. P1 .....4.85
SanFrancisco S7 .....5.10

BAR SHAPES, Hot-Rolled Alloy

Clairton,Pa. U5 .....5.00
Fontana,Calif. K1 ....5.923
Gary,Ind. U5 .....5.00
Houston S5 .....5.60
KansasCity S5 .....5.60
Youngstown U5 .....5.00

BARS, Cold-Finished Carbon

Ambridge,Pa. W18 ....5.20
BeaverFalls,Pa. M12 ..5.20
BeaverFalls,Pa. R2 ....5.26
Buffalo B5 .....5.25
Camden,N.J. P13 .....5.65
Carnegie,Pa. C12 .....5.20
Chicago W18 .....5.20
Cleveland A7, C20 ....5.20
Detroit P17, R7 .....5.35
Detroit B5 .....5.40
Donora,Pa. A7 .....5.20
Elyria,O. W8 .....5.20
FranklinPark,Ill. N5 ..5.20
Gary,Ind. R2 .....5.27
GreenBay, Wis. F7 ....5.20
Hammond,Ind. L2, M13.5.20
Hartford,Conn. R2 ....5.70
Harvey,Ill. B5 .....5.20
LosAngeles R2 ....6.65-6.96
LosAngeles S30 .....6.65
Mansfield,Mass. B5 ....5.75
Massillon,O. R8 .....5.20
Massillon,O. R2 .....5.24
Monaca,Pa. S17 .....5.20
Newark,N.J. W18 ....5.65
NewCastle,Pa.(17) B4 ..5.20
Pittsburgh J5 .....5.20
Plymouth,Mich. P5 ....5.45
Putnam,Conn. W18 ....5.75
Readville,Mass. C14 ....5.75
St.Louis,Mo. M5 .....5.50
So.Chicago,Ill. W14 ....5.20
SpringCity,Pa. K3 .....5.65
Struthers,O. Y1 .....5.20
Waukegan,Ill. A7 .....5.20
Worcester,Mass. W19 ...6.10
Youngstown F3, Y1 ....5.20

BARS, Cold-Finished Alloy
(Turned and Ground)

Cumberland,Md.(5) C19 4.45

BARS, Cold-Finished Alloy

Ambridge,Pa. W18 ....6.325
BeaverFalls,Pa. M12 ..6.325
Bethlehem,Pa. B2 ....6.325
Buffalo B5 .....6.325
Camden,N.J. P13 .....6.50
Canton,O. R2, T7 ....6.325
Carnegie,Pa. C12 ....6.325
Chicago W18 .....6.325
Cleveland A7, C20 ....6.325
Detroit R7 .....6.425
Detroit P17 .....6.475
Detroit B5 .....6.525
Donora,Pa. A7 .....6.325
Elyria,O. W8 .....6.325
Gary,Ind. R2 .....6.325
Hammond,Ind. L2,M13.6.325
Hartford,Conn. R2 ....6.775
Harvey,Ill. B5 .....6.325
Lackawanna,N.Y. B2 ..6.325
Mansfield,Mass. B5 ..6.775
Massillon,O. R2, R8 ..6.325
Midland,Pa. C18 .....6.325
Monaca,Pa. S17 .....6.325
Newark,N.J. W18 .....6.65
Plymouth,Mich. P5 ....6.525
So.Chicago,Ill. R2,W14.6.325
SpringCity,Pa. K3 ....6.50
Struthers,O. Y1 .....6.325
Warren,O. C17 .....6.325
Waukegan,Ill. A7 ....6.325
Worcester,Mass. A7 ..6.625
Youngstown F3, Y1 ..6.325

BARS, Reinforcing (fabricators)

AlabamaCity,Ala. R2 ...4.15
Atlanta A11 .....4.35
Birmingham,Ala. C15 ..4.15
Buffalo R2 .....4.15
Cleveland R2 .....4.15
Emeryville,Calif. J7 ....4.90
Fairfield,Ala. T2 .....4.15
Fairless,Pa. U5 .....4.30
Fontana,Calif. K1 .....4.85
Gary,Ind. U5 .....4.15
Houston S5 .....4.55
Ind.Harbor,Ind. I-2, Y1.4.15
Johnstown,Pa. B2 .....4.15
KansasCity,Mo. S5 .....4.75
Lackawanna,N.Y. B2 ..4.15
LosAngeles B3 .....4.85
Milton,Pa. M18 .....4.15
Minnequa,Colo. C10 ....4.75
Niles,Calif. P1 .....4.85
Pittsburg,Calif. C11 ....4.85
Pittsburgh J5 .....4.15
SandSprings,Okla. S5 ..5.00
Seattle B3, N14, P23...4.90
So.Chicago,Ill. R2 .....4.15
So.Duquesne,Pa. U5 ...4.15
So.SanFrancisco B3 ....4.90
SparrowsPoint,Md. B2 ..4.15
Sterling,Ill.(1) N15 ...4.15
Struthers,O. Y1 .....4.15
Torrance,Calif. C11 ....4.85
Youngstown R2,U5 ....4.15

BARS, Reinforcing
(Fabricated; to consumers)

Johnstown, ¼-1" B2 ...5.55
KansasCity S5 .....6.35
LosAngeles B3 .....5.80
Marion,O. P11 .....5.55
Seattle N14 .....5.80
Seattle B3, P23 .....5.85
So.SanFrancisco B3 ....5.85
SparrowsPt. ⅜-1" B2 ..5.55
Williamsport,Pa. S19 ...5.45

RAIL STEEL BARS

Avis,Pa.(3) J8 .....4.25
ChicagoHts.(3) C2, I-2..4.05
ChicagoHts.(4) C2, I-2..4.15
Ft.Worth,Tex.(26) T4 ..4.65
Franklin,Pa.(3) F5 ....4.05
Franklin,Pa.(4) F5 ....4.15
Marion,O.(3) P11 .....4.15
Moline,Ill.(3) R2 .....4.15
Tonawanda(3,4) B12 ....4.15
Williamsport,Pa.(3) S19.4.25
Williamsport,Pa.(4) S19.5.45

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 10.40
Economy,Pa.(D.R.)B14 12.90
Economy(Staybolt) B14 13.20
McK.Rks.(S.R.) L5 ...10.40
McK.Rks.(D.R.) L5 ...14.00
McK.Rks.(Staybolt) L5.15.50

SHEETS

SHEETS, Hot-Rolled Steel
(18 gage and heavier)

AlabamaCity,Ala. R2 ..3.925
Allenport,Pa. P7 .....3.925
Ashland,Ky.(8) A10 ..3.925
Cleveland J5, R2 .....3.925
Conshohocken,Pa. A3 ..3.975
Detroit M1 .....4.075
Ecorse,Mich. G5 .....4.075
Fairfield,Ala. T2 .....3.925
Fairless,Pa. U5 .....3.975
Fontana,Calif. K1 .....4.70
Gary,Ind. U5 .....3.925
Geneva,Utah C11 .....4.025
GraniteCity,Ill. G4 ....4.125
Ind.Harbor,Ind. I-2, Y1.3.925
Irvin,Pa. U5 .....3.926

Kokomo,Ind. C16 .....4.025
Lackawanna,N.Y. B2 ..3.925
Munhall,Pa. U5 .....3.925
Newport,Ky. N9 .....3.925
Niles,O. N12 .....5.175
Pittsburg,Calif. C11 ...4.625
Pittsburgh J5 .....3.925
Portsmouth,O. P12 ...3.925
Riverdale,Ill. A1 .....3.925
Sharon,Pa. S3 .....3.925
So.Chicago,Ill. W14 ..3.925
SparrowsPoint,Md. B2.3.925
Steubenville,O. W10 ..3.925
Torrance,Calif. C11 ...4.625
Warren,O. R2 .....3.925
Weirton,W.Va. W6 ...3.925
Youngstown U5, Y1 ...3.925

SHEETS H.R. (19 gage)

AlabamaCity,Ala. R2 ..5.225
Dover,O. R1 .....5.05
Kokomo,Ind. C16 ....5.025
Mansfield,O. E6 .....5.05
Niles,O. N12 .....4.775
Torrance,Calif. C11 ..5.875

SHEETS, H.R. (14 ga. heavier) High-Strength Low-Alloy

Cleveland J5, R2 .....5.90
Conshohocken,Pa. A3 ..5.90
Ecorse,Mich. G5 .....6.05
Fairfield,Ala T2 .....5.90
Fairless,Pa. U5 .....5.95
Fontana,Calif. K1 ....6.675
Gary,Ind. U5 .....5.90
Ind.Harbor,Ind. I-2 ....5.90
Ind.Harbor,Ind. Y1 ....6.40
Irvin,Pa. U5 .....5.90
Lackawanna(35) B2 ...5.90
Munhall,Pa. U5 .....5.90
Pittsburgh J5 .....5.90
Sharon,Pa. S3 .....5.90
So.Chicago,Ill. U5 .....5.90
SparrowsPoint(36) B2 ..5.90
Warren,O. R2 .....5.90
Weirton,W.Va. W6 ....5.90
Youngstown U5 .....5.90
Youngstown Y1 .....6.40

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ..4.175
Cleveland R2 .....4.525
Ind.Harbor,Ind. I-2 ..4.175
Warren,O. R2 .....4.525

SHEETS, Cold-Rolled Steel (Commercial Quality)

Allenport,Pa. P7 .....4.775
Cleveland J5, R2 ....4.775
Ecorse,Mich. G5 .....4.925
Fairfield,Ala T2 .....4.775
Fairless,Pa. U5 .....4.825
Follansbee,W.Va. F4 ..4.775
Fontana,Calif. K1 .....5.875
Gary,Ind. U5 .....4.775
GraniteCity,Ill. G4 ....4.975
Ind.Harbor,Ind. I-2, Y1.4.775
Irvin,Pa. U5 .....4.775
Lackawanna,N.Y. B2..4.775
Middletown,O. A10 ....4.775
Pittsburg,Calif. C11 ...5.725
Pittsburgh J5 .....4.775
Portsmouth,O. P12 ....4.775
SparrowsPoint,Md. B2..4.775
Steubenville,O. W10 ...4.775
Warren,O. R2 .....4.775
Weirton,W.Va. W6 ....4.775
Youngstown Y1 .....4.775

SHEETS, Cold-Rolled High-Strength Low-Alloy

Cleveland J5, R2 .....7.225
Ecorse,Mich. G5 .....7.375
Fairless,Pa. U5 .....7.275
Fontana,Calif. K1 ....8.275
Gary,Ind. U5 .....7.225
IndianaHarbor,Ind. Y1.7.725
Irvin,Pa. U5 .....7.225
Lackawanna(37) B2 ..7.225
Pittsburgh J5 .....7.225
SparrowsPoint(38) B2.7.225
Warren,O. R2 .....7.225
Weirton,W.Va. W6 ....7.225
Youngstown Y1 .....7.725

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....5.375
Middletown,O. A10 ....5.275
Warren,O. R2 .....5.375

SHEETS, Culvert	Cu Alloy	Cu Fe
Ashland,Ky. A10	6.325	....
Canton,O. R2	6.075	6.675
Fairfield T2	6.075	6.325
Gary,Ind. U5	6.075	6.325
Ind.Harbor I-2	6.075	6.325
Irvin,Pa. U5	6.075	6.325
Kokomo,Ind. C16	6.175	....
MartinsFry.,O. W10	6.075	....
Pitts.,Calif. C11	6.825	....
SparrowsPt. B2	6.075	....
Torrance,Cal. C11	7.075	....

SHEETS, Culvert	Pure Iron
Ashland,Ky. A10	6.575
Fairfield,Ala. T2	6.325
MartinsFerry,O. W10	6.325

SHEETS, Gal'd No. 10 Steel

AlabamaCity,Ala. R2 ..5.275
Ashland,Ky.(8) A10 ..5.275
Canton,O. R2 .....5.275
Delphos,O. N16 .....5.775
Dover,O. R1 .....5.275
Fairfield,Ala. T2 .....5.275
Gary,Ind. U5 .....5.275
GraniteCity,Ill. G4 ....5.475
Ind.Harbor,Ind. I-2 ...5.275
Irvin,Pa. U5 .....5.275
Kokomo,Ind. C16 .....5.375
MartinsFerry,O. W10 ..5.275
Niles,O. N12 .....5.275
Pittsburg,Calif. C11 ...6.025
SparrowsPoint,Md. B2.5.275
Steubenville,O. W10 ..5.275
Torrance,Calif. C11 ...6.275
Weirton,W.Va. W6 ....5.275

SHEETS, Galvanized No. 10 High-Strength Low-Alloy

Irvin,Pa. U5 .....7.925
SparrowsPoint(39) B2..8.075

SHEETS, Galvanized Ingot Iron No. 10 flat

Ashland,Ky.(8) A10 ..5.525
Canton,O. R2 .....6.025

SHEETS, Galvannealed Steel

Canton,O. R2 .....5.825
Irvin,Pa. U5 .....5.825
Kokomo,Ind. C16 .....5.925
Niles,O. N12 .....5.825

SHEETS, ZINCGRIP Steel

Butler,Pa. A10 .....5.275
Middletown,O. A10 ....5.275

SHEETS, ZINCGRIP Ingot Iron

Butler,Pa. A10 .....5.575
Middletown,O. A10 ....5.575

SHEETS, Electrogalvanized

Cleveland R2 (28) 6.125
Niles,O. R2 (28) 6.125
Weirton,W.Va. W6 ....5.975

SHEETS, ALUMINIZED

Butler,Pa. A10 .....8.625

SHEETS, Enameling Iron

Ashland,Ky.(8) A10 ..5.175
Cleveland R2 .....5.175
Gary,Ind. U5 .....5.175
GraniteCity,Ill. G4 ....5.375
Ind.Harbor,Ind. I-2 ..5.175
Irvin,Pa. U5 .....5.175
Middletown,O. A10 ....5.175
Niles,O. N12 .....6.525
Youngstown Y1 .....5.175

BLUED STOCK, 29 ga.

Follansbee,W.Va. F4 ...7.20
Follansbee(23) F4 ....6.425
Yorkville.O. W10 .....7.20

SHEETS, Long Terne Steel (Commercial Quality)

BeechBott'm,W.Va.W10 5.675
Gary,Ind. U5 .....5.675
Mansfield,O. E6 .....5.675
Middletown,O. A10 ...5.675
Niles,O. N12 .....5.675
Weirton,W.Va. W6 ....5.675

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....6.075

SHEETS, Well Casing

Fontana,Calif. K1 ....6.20

STRIP

STRIP, Hot-Rolled Carbon

Ala.City.Ala.(27) R2 ..3.925
Allenport,Pa. P7 .....3.925
Alton,Ill. L1 .....4.10
Ashland,Ky.(8) A10 ..3.925
Atlanta A11 .....4.125
Bessemer,Ala. T2 .....3.925
Birmingham C15 .....3.925
Bridgeport,Conn.(10)S15 3.95
Buffalo(27) R2 .....3.925
Carnegie,Pa. S18 .....4.425
Conshohocken,Pa. A3 ..4.05
Detroit M1 .....4.075
Ecorse,Mich. G5 .....4.075
Fairfield,Ala. T2 .....3.925
Fontana,Calif. K1 .....4.70
Gary,Ind. U5 .....3.925
Houston,Tex. S5 .....4.325
Ind.Harbor,Ind. I-2,Y1.3.925
Johnstown,Pa.(25) B2..3.925
KansasCity,Mo.(9) S5 .4.525
Lackw'na,N.Y.(25) B2.3.925
LosAngeles(25) B3 ....4.675
Milton,Pa. M18 .....3.925
Minnequa,Colo. C10 ...5.025
NewBritain(10) S15 ...4.15
N.Tonawanda,N.Y. B11 3.925
Pittsburg,Calif. C11 ..4.675
Portsmouth,O. P12 ....3.925
Riverdale,Ill.. A1 .....3.925
SanFrancisco S7 .....5.10
Seattle(25) B3, P23 ...4.925
Seattle N14 .....4.925
Sharon,Pa. S3 .....3.925
So.Chicago,Ill. W14 ...3.925
So.SanFrancisco(25)B3 4.675
SparrowsPoint,Md. B2..3.925
Torrance,Calif. C11 ....4.675
Warren,O. R2 .....3.925
Weirton,W.Va. W6 ....3.925
Youngstown U5 .....3.925

STRIP, Hot-Rolled Alloy

Bridgeport,Conn.(10)S15 6.45
Carnegie,Pa. S18 .....6.40
Fontana,Calif. K1 .....7.80
Gary,Ind. U5 .....6.40
Houston,Tex. S5 .....6.50
KansasCity,Mo. S5 .....7.00
LosAngeles B3 .....7.60
NewBritn.,Conn.(10)S15 6.45
Sharon,Pa. S3 .....6.40
So.Chicago W14 .....6.40
Youngstown U5 .....6.40

STRIP, Hot-Rolled High-Strength Low-Alloy

Bessemer,Ala. T2 .....5.95
Conshohocken,Pa. A3 ...5.90
Ecorse,Mich. G5 .....6.10
Fairfield,Ala. T2 .....5.95
Fontana,Calif. K1 .....7.05
Gary,Ind. U5 .....5.95
Ind.Harbor,Ind. I-2 ....5.95
Ind.Harbor,Ind. Y1 ....6.45
Lackawanna,N.Y. B2 ..6.00
LosAngeles(25) B3 ....6.70
Seattle(25) B3, P23 ....6.95
Sharon,Pa. S3 .....5.95
So.SanFrancisco(25) B3.6.70
SparrowsPoint,Md. B2 ..6.00
Warren,O. R2 .....5.95
Weirton,W.Va. W6 .....5.95
Youngstown Y1 .....6.45
Youngstown U5 .....5.95

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10 ..4.175
Warren,O. R2 .....4.525

STRIP, Cold-Rolled Carbon

Anderson,Ind. G5 .....5.45
Baltimore T6 .....5.60
Bridgeport,Conn.(10)S15 5.45
Cleveland A7, J5 .....5.45
Dearborn,Mich. D3 ....5.60
Detroit D2, M1 .....5.60
Detroit P20 .....5.65
Dover,O. G6 .....5.45
Ecorse,Mich. G5 .....5.60
Follansbee,W.Va. F4 ..5.45
Fontana,Calif. K1 .....7.35
FranklinPark,Ill. T6 ...5.70
Ind.Harbor,Ind. I-2 ....5.70
Indianapolis C8 .....5.60
Lackawanna,N.Y. B2 ..5.45
LosAngeles C1 .....7.50
Mattapan,Mass. T6 ....6.10
Middletown,O. A10 ....5.45
NewBedford,Mass. R10..6.00
NewBritain(10) S15 ....5.45
NewCastle,Pa. B4, E5 ..5.45
NewHaven,Conn. A7 ...6.20
NewHaven,Conn. D2 ....5.90
Pawtucket,R.I. N8, R3..6.10
Pittsburgh J5 .....5.45
Riverdale,Ill. A1 .....5.70
Rome,N.Y.(32) R6 .....5.45
Sharon,Pa. S3 .....5.45
SparrowsPoint,Md. B2 ..5.45
Trenton,N.J. R5 .....7.00
Wall'ford,Conn. W2 ....5.90
Warren,O.(40) T5 .....5.45
Warren,O. B9, R2 .....5.45
Weirton,W.Va. W6 .....5.45
Worcester,Mass. A7 ....6.30
Youngstown C8, Y1 ....5.45

STRIP, Cold-Rolled Alloy Steel

Carnegie,Pa. S18 .....12.00
Cleveland A7 .....12.00
Dover,O. G6 .....12.00
Fontana,Calif. K1 ....13.65
Harrison,N.J. C18 ....12.00
Pawtucket,R.I.(11) N8.12.15
Pawtucket,R.I.(12) N8.12.45
Sharon,Pa. S3 .....12.00
Worcester,Mass. A7 ...12.30
Youngstown C8 .....12.00

STRIP, Cold-Rolled High-Strength Low-Alloy

Cleveland J5 .....7.80
Cleveland A7 .....8.15
Dearborn,Mich. D3 ....7.90
Dover,O. G6 .....8.00
Ecorse,Mich. G5 .....8.30
Lackawanna,N.Y. B2 ..8.15
Pittsburgh J5 .....7.80
Sharon,Pa. S3 .....7.65
SparrowsPoint,Md. B2 ..8.15
Warren,O. R2 .....7.60
Weirton,W.Va. W6 ....8.15
Youngstown Y1 .....8.30

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2 .....6.05

STRIP, Electrogalvanized

Dover,O. G6 .....5.45
Warren,O. B9, T5 ....5.45
Weirton,W.Va. W6 ....5.45
Youngstown C8 .....5.70

TIGHT, COOPERAGE HOOP

Atlanta A11 .....4.65
Riverdale,Ill. A1 .....4.50
Sharon,Pa. S3 .....4.35
Youngstown U5 .....4.35

Key to Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Co.
A7 American Steel & Wire
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A13 American Cladmetals Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo-Eclipse Corp.
B12 Buffalo Steel Div., H. K. Porter Co. Inc.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C5 Central Iron & Steel Div. Barium Steel Corp.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div. H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Products Dept. Wickwire Spencer Steel Division
C23 Charter Wire Products
C24 G. O. Carlson Inc.

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel
D4 Disston & Sons, Henry
D6 Driver Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G2 Globe Iron Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel&Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M5 Medart Co.
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M13 Monarch Steel Co.
M16 Md. Fine&Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Prod. Div., Merritt-Chapman&Scott

N2 National Supply Co.
N3 National Tube Div.
N5 Nelsen Steel & Wire Co.
N6 NewEng.HighCarb.Wire
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N12 Niles Rolling Mill Div.
N14 Nrthwst.Steel Roll. Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.

O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P4 Phoenix Iron & Steel Co.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Division Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P20 Prod. Steel Strip Corp.
P23 Pacific Steel Rolling

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 RelianceDiv.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S16 Struthers Iron & Steel
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S25 Stainless Welded Products
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.

T2 Tenn. Coal & Iron Div.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Steel Co.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel & Mfg. Co.
W8 West.Auto.Mach.Screw
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
W19 Worcester Pressed Steel

Y1 Youngstown Sheet & Tube

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	5.60	7.95	8.90	10.85	13.15
Bridgeport,Conn.(10) S15	5.45	7.65	8.60	10.55	12.85
Bristol,Conn. W1	...	...	8.90	10.85	....
Carnegie,Pa. S18	...	7.65	8.60	10.55	12.85
Cleveland A7	5.45	7.65	8.60	10.55	12.85
Cleveland,O. C7	...	8.00	8.60	10.55	12.85
Dearborn,Mich. D3	5.60	7.85	8.80	....	....
Detroit D2	5.65	7.85	8.80	10.55	....
Dover,O. G6	5.45	7.65	8.60	10.55	12.85
FranklinPark,Ill. T6	5.70	7.80	8.75	10.70	13.00
Harrison,N.J. C18	...	...	8.90	10.85	13.15
Indianapolis C8	...	7.80	8.60	10.55	....
Mattapan,Mass. T6	6.10	7.95	8.90	10.85	13.15
NewBritn.,Conn.(10) S15	5.45	7.65	8.60	10.55	12.85
NewCastle,Pa. B4	5.45	7.65	8.60	....	....
NewCastle,Pa. E5	5.45	8.00	8.60	10.55	12.85
NewHaven,Conn. D2	5.90	7.95	8.90	10.85	....
NewYork W3	...	7.95	8.90	10.85	13.15
Pawtucket,R.I.(11) N8	...	7.65	8.60	10.55	12.85
Pawtucket,R.I.(12) N8	6.10	7.95	8.90	10.85	13.15
Sharon,Pa. S3	5.45	7.65	8.60	10.55	12.85
Trenton,N.J. R5	...	7.95	8.90	10.85	13.15
Wallingford,Conn. W2	5.90	7.95	8.90	10.85	13.15
Warren,O. T5	5.45	7.65	8.60	10.55	12.85
Weirton,W.Va. W6	5.45	7.65	8.60	10.55	12.85
Worcester,Mass. A7	6.30	7.95	8.90	10.85	13.15
Worcester,Mass. T6	6.10	7.95	8.90	10.85	13.15
Youngstown C8	...	7.65	8.60	10.55	12.85
Spring Steel (Tempered)					
Bristol,Conn. W1	...	...	12.50	15.00	....
Buffalo W12	...	...	12.50	....	....
FranklinPark,Ill. T6	...	...	13.25	15.75	18.75
Harrison,N.J. C18	...	...	12.50	15.00	18.00
NewYork W3	...	...	12.50	15.00	18.00
Trenton,N.J. R5	...	...	12.50	15.00	18.00
Worcester,Mass. T6	...	...	12.50	15.00	18.00
Worcester,Mass. W12	...	...	12.50	....	....
Youngstown C8	...	...	12.85	15.35	18.35

SILICON STEEL

H.R. SHEETS (22 gage) (Cut Lengths)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	...	...	8.75	9.75	10.65
Brackenridge,Pa. A4	...	...	8.75	9.75	10.65
IndianaHarbor,Ind. I-2	7.85	8.15	8.75	9.75	....
Mansfield,O. E6	7.85	8.15	8.75	9.75	10.65
Newport,Ky. N9	7.85	8.15	8.75	9.75	10.65
Niles,O. N12	7.85	8.15	8.75	9.75	....
Vandergrift,Pa. U5	...	8.15	8.75	9.75	10.65
Warren,O. R2	7.85	8.15	8.75	9.75	....
Zanesville,O. A10	...	8.15	8.75	9.75	10.65

C.R. COILS & CUT LENGTHS, (22 Ga.) Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
GraniteCity,Ill. G4	8.25*	8.60*	9.20*	10.20*	....
IndianaHarbor,Ind. I-2	8.05	8.40*	9.00*	....	....
Vandergrift,Pa. U5	8.05*	8.90	9.50	10.50	11.40
Warren,O. R2	8.05†	8.90	9.50	10.50	11.40

H.R. SHEETS (22 Gage) (Cut Lengths)	Transformer Grade T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	11.80	12.15	12.65	13.65
Brackenridge,Pa. A4	11.60	....	....	....
Newport,Ky. N9	11.60	....	....	....
Vandergrift,Pa. U5	11.60	12.15	12.65	13.65
Zanesville,O. A10	11.60	12.15	12.65	13.65

C.R. COILS & CUT LENGTHS (22 Ga.)	T-100	T-90	T-80	T-73	T-72
Butler,Pa. A10	....	....	16.25	16.75	....
Vandergrift,Pa. U5	13.65	14.65	16.25	16.75	12.35‡
Warren,O. R2	....	....	....	....	12.35‡

* Semiprocessed. † Fully processed only. ‡ Coils annealed; semiprocessed ½c lower.

TIN MILL PRODUCTS

TIN PLATE Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$7.40	$7.65	$8.05
Fairfield,Ala. T2	7.50	7.75	8.15
Fairless,Pa. U5	7.50	7.75	8.15
Gary,Ind. U5	7.40	7.65	8.05
GraniteCity,Ill. G4	7.60	7.85	8.25
IndianaHarbor,Ind. I-2, Y1	7.40	7.65	8.05
Irvin,Pa. U5	7.40	7.65	8.05
Niles,O. R2	7.40	7.65	8.05
Pittsburg,Calif. C11	8.15	8.40	8.80
SparrowsPoint,Md. B2	7.50	7.75	8.15
Weirton,W.Va. W6	7.40	7.65	8.05
Yorkville,O. W10	7.40	7.65	8.05

TIN PLATE, American Coke (Base Box)	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$8.70	$8.95
Fairfield,Ala. T2	8.80	9.05
Fairless,Pa. U5	8.80	9.05
Gary,Ind. U5	8.70	8.95
Ind.Har. I-2, Y1	8.70	8.95
Irvin,Pa. U5	8.70	8.95
Pitts.,Cal. C11	9.45	9.70
Sp.Pt.,Md. B2	8.80	9.05
Warren,O. R2	8.70	8.95
Weirton,W.Va.W6	8.70	8.95
Yorkville,O. W10	8.70	8.95

BLACK PLATE (Base Box)	
Aliquippa,Pa. J5	$6.50
Fairfield,Ala. T2	6.60
Fairless,Pa. U5	6.60
Gary,Ind. U5	6.50
GraniteCity,Ill. G4	6.70
Ind.Harbor,Ind. I-2, Y1	6.50
Irvin,Pa. U5	6.50
Niles,O. R2	6.50
Pittsburg,Calif. C11	7.25
SparrowsPoint,Md. B2	6.60
Warren,O. R2	6.50
Weirton,W.Va. W6	6.50
Yorkville,O. W10	6.50

HOLLOWARE ENAMELING Black Plate (29 gage)	
Follansbee,W.Va. F4	6.10
Gary,Ind. U5	6.10
GraniteCity,Ill. G4	6.30
Ind.Harbor,Ind. Y1	6.10
Irvin,Pa. U5	6.10
Yorkville,O. W10	6.10

MANUFACTURING TERNES (Special Coated))	
Fairfield,Ala. T2	$7.85
Gary,Ind. U5	7.75
Irvin,Pa. U5	7.75
Yorkville,O. W10	7.75

MANUFACTURING TERNES, 8 lb (Commercial Quality)	
Gary,Ind. U5	$9.75
Yorkville,O. W10	9.75

MANUFACTURING TERNES, LT. Coated, 6 lb	
Yorkville,O. W10	$8.65

ROOFING SHORT TERNES (8 lb Coated)	
Gary,Ind. U5	9.75

WIRE

WIRE, Manufacturers Bright, Low Carbon	
AlabamaCity,Ala. R2	5.525
Aliquippa,Pa. J5	5.525
Alton,Ill. L1	5.70
Atlanta A11	5.725
Bartonville,Ill. K4	5.625
Buffalo W12	5.525
Chicago W13	5.525
Cleveland A7, C20, R2	5.525
Crawfordsville,Ind. M8	5.625
Donora,Pa. A7	5.525
Duluth,Minn. A7	5.525
Fairfield,Ala. T2	5.525
Fostoria,O. (24) S1	5.75
Houston S5	5.925
Jacksonville,Fla. M8	6.05
Johnstown,Pa. B2	5.525
Joliet,Ill. A7	5.525
KansasCity,Mo. S5	6.125
Kokomo,Ind. C16	5.625
LosAngeles B3	6.475
Minnequa,Colo. C10	5.775
Monessen,Pa. P7	5.525
No.Tonawanda B11	5.525
Palmer,Mass. W12	5.825
Pittsburg,Calif. C11	6.475
Portsmouth,O. P12	5.525
Rankin,Pa. A7	5.525
So.Chicago,Ill. R2	5.525
So.SanFrancisco C10	6.475
SparrowsPoint,Md. B2	5.625
Sterling,Ill.(1) N15	5.525
Struthers,O. Y1	5.525
Waukegan,Ill. A7	5.525
Worcester,Mass. A7	5.825

WIRE, MB Spring, High Carbon	
Aliquippa,Pa. J5	6.925
Alton,Ill. L1	7.10
Bartonville,Ill. K4	7.025
Buffalo W12	6.925
Cleveland A7	6.925
Donora,Pa. A7	6.925
Duluth,Minn. A7	6.925
Fostoria,O. S1	6.925
Johnstown,Pa. B2	6.925
LosAngeles B3	7.875
Millbury,Mass.(12) N6	7.225
Minnequa,Colo. C10	7.175
Monessen,Pa. P7, P16	6.925
Muncie,Ind. I-7	7.125
Palmer,Mass. W12	7.225
Pittsburg,Calif. C11	7.875
Portsmouth,O. P12	6.925
Roebling,N.J. R5	7.225
So.Chicago,Ill. R2	6.925
So.SanFran. C10	7.875
SparrowsPt.,Md. B2	7.025
Struthers,O. Y1	6.925
Trenton,N.J. A7	7.225
Waukegan,Ill. A7	6.925
Worcester A7, J4	7.225
Worcester T6, W12	7.225

WIRE, Upholstery Spring	
Aliquippa,Pa. J5	6.625
Alton,Ill. L1	6.80
Buffalo W12	6.625
Cleveland A7	6.625
Donora,Pa. A7	6.625
Duluth,Minn. A7	6.625
Johnstown,Pa. B2	6.625
LosAngeles B3	7.575
Minnequa,Colo. C10	6.80
Monessen,Pa. P7, P16	6.625
NewHaven,Conn. A7	6.925
Palmer,Mass. W12	6.925
Pittsburg,Calif. C11	7.575
Portsmouth,O. P12	6.625
Roebling,N.J. R5	6.925
So.Chicago,Ill. R2	6.625
So.SanFrancisco C10	7.575
SparrowsPoint,Md. B2	6.725
Trenton,N.J. A7	6.925
Waukegan,Ill. A7	6.625
Worcester,Mass. A7	6.925

WIRE, Fine & Weaving (8" Coils)	
Alton,Ill. L1	10.75
Bartonville,Ill. K4	10.65
Buffalo W12	10.55
Chicago W13	10.55
Cleveland A7	10.55
Crawfordsville,Ind. M8	10.65
Fostoria,O. S1	10.55
Jacksonville,Fla. M8	11.08
Johnstown,Pa. B2	10.55
Kokomo,Ind. C16	10.55
Minnequa,Colo. C10	10.30
Monessen,Pa. P16	10.55
Muncie,Ind. I-7	10.75
Palmer,Mass. W12	10.85
Roebling,N.J. R5	10.85
So.SanFrancisco C10	10.90
Waukegan,Ill. A7	10.55
Worcester,Mass. A7, T6	10.85

WIRE, Galv'd ACSR for Cores	
Bartonville,Ill. K4	9.50
Buffalo W12	9.50
Johnstown,Pa. B2	9.50
Minnequa,Colo. C10	9.625
Monessen,Pa. P16	9.50
Muncie,Ind. I-7	9.70
Portsmouth,O. D2	9.50
Roebling,N.J. R5	9.80
SparrowsPt.,Md. B2	9.60

ROPE WIRE (A)	
Alton,Ill. L1	9.45
Bartonville,Ill. K4	9.35
Buffalo W12	9.35
Fostoria,O. S1	9.35
Johnstown,Pa. B2	9.35
Monessen,Pa. P7, P16	9.35
Muncie,Ind. I-7	9.55
Palmer,Mass. W12	9.65
Portsmouth,O. P12	9.35
Roebling,N.J. R5	9.65
SparrowsPt. B2	9.45
Struthers,O. Y1	9.35
Worcester J4, T6	9.65

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

WIRE, Tire Bead	
Alton,Ill. L1	12.75
Bartonville,Ill. K4	12.65
Monessen,Pa. P16	12.55
Roebling,N.J. R5	12.85

WIRE, Cold-Rolled Flat	
Anderson,Ind. G6	7.45
Baltimore T6	7.75
Buffalo W12	7.45
Cleveland A7	7.45
Crawfordsville,Ind. M8	7.55
Dover,O. G6	7.45
Fostoria,O. S1	7.45
Kokomo,Ind. C16	7.55
FranklinPark,Ill. T6	7.60
Massillon,O. R8	7.45
Monessen,Pa. P7, P16	7.45
Pawtkt.,R.I.(12) N8	7.75
Trenton,N.J. R5	7.75
Worcester A7, T6, W12	7.75

WIRE, Merchant Quality (6 to 8 gage)	An'ld. Galv.
Ala.City R2	6.675 7.075**
Aliquippa J5	6.675 7.20*
Atlanta A11	6.775 7.30
Bartonville(48)K4	6.775 7.30
Buffalo W12	6.675 7.075†
Cleveland A7	6.675 ...
Crawfordsville M8	6.775 7.30
Donora,Pa. A7	6.675 7.075†
Duluth,Minn. A7	6.675 7.075†
Fairfield T2	6.675 7.075†
Houston,Tex. S5	7.075 7.475
Jacksonville,Fla. M8	7.20 7.73
JohnstownB2(48)	6.675 7.225*
Joliet,Ill. A7	6.675 7.075†
KansasCity,Mo. S5	7.275 7.675
Kokomo C16	6.775 7.175†
LosAngeles B3	7.625 ...
Minnequa C10	6.925 7.325**
Monessen P7(48)	6.675 7.225
Palmer W12	6.975 7.375†
Pitts.,Calif. C11	7.625 8.025†
Portsmouth,O.P12	6.675 ....
Rankin A7	6.675 7.075†
So.Chi'go R2	6.675 7.075**
S.S.Frn.(48)C10	7.625 8.025**
Spar'wsPt.B2(48)	6.775 7.325*
Sterl'g(1)(48)N15	6.675 7.20
Struthers,O. Y1	6.675 7.175
Worcester A7	6.975 ...

* Based on 10c zinc; † 5c zinc; ** Subject to zinc equalization extras.

WOVEN FENCE, 9-15½Ga.	Col.
Ala.City,Ala. R2	140**
Ala.City, 17 ga. R2	235**
Ala.City, 18 ga. R2	245**
Aliq'ppa,Pa.9-14½ga.J5	143*
Atlanta A11	145
Bartonville,Ill. K4	145
Crawfordsville,Ind. M8	145
Donora,Pa. A7	140†
Duluth,Minn. A7	140†
Fairfield,Ala. T2	140†
Houston,Tex. S5	148
Johnstown,Pa. B2	143
Johnstown 17 ga., 6" B2	234
Johnstown 4" B2	237
Joliet,Ill. A7	140†
KansasCity,Mo. S5	152
Kokomo,Ind. C16	142†
Minnequa,Colo. C10	148**
Monessen,Pa. 9 ga. P7	145
Pittsburg,Calif. C11	163†
Rankin,Pa. A7	140†
So.Chicago,Ill. R2	140**
Sterling,Ill. (1) N15	143

† Based on 5c zinc; * 11c zinc; ** Subject to zinc equalization extras.

BALE TIES, Single Loop	Col.
AlabamaCity,Ala. R2	149
Atlanta A11	151
Bartonville,Ill. K4	151
Crawfordsville,Ind. M8	151
Donora,Pa. A7	149
Duluth,Minn. A7	149
Fairfield,Ala. T2	149
Joliet,Ill. A7	149
KansasCity,Mo. S5	161
Kokomo,Ind. C16	151
Minnequa,Colo. C10	154
Pittsburg,Calif. C11	173
So.Chicago,Ill. R2	149
So.SanFran.,Calif. C10	173
SparrowsPoint,Md. B2	151
Sterling,Ill.(1) N15	149

WIRE, Barbed	Col.
AlabamaCity R2	153**
Aliquippa J5	150*
Atlanta A11	158
Bartonville,Ill. K4	158
Crawfordsville,Ind. M8	158
Donora,Pa. A7	153†
Duluth,Minn. A7	153†
Fairfield,Ala. T2	153†
Houston,Tex. S5	161
Johnstown,Pa. B2	156*
Joliet,Ill. A7	153†
KansasCity,Mo. S5	165
Kokomo,Ind. C16	155†
Minnequa,Colo. C10	159**
Monessen,Pa. P7	157
Pittsburg,Calif. C11	173†
Rankin,Pa. A7	153†
So.Chicago,Ill. R2	153**
S.SanFrancisco C10	176**
SparrowsPoint,Md. B2	158*
Sterling,Ill. (1) N15	156

† Based on 5c zinc; * 11c zinc; ** Subject to zinc equalization extras.

WIRE (16 gage)	An'ld. Stone	Galv. Stone
Ala.City R2	12.50	14.05**
Aliquippa J5	12.50	14.30*
Bartonville K4	12.60	14.40
Buffalo W12	12.50	....
Cleveland A7	12.50	....
CrawfordsvilleM8	12.50	14.30
Fostoria,O. S1	12.60	14.15
Johnstown B2	12.50	14.35*
Kokomo C16	12.60	14.15†
Minnequa C10	12.75	14.45**
Palmer,Mas.W12	12.50	14.05†
Pitts.,Calif. C11	12.85	14.40†
SparrowsPt. B2	12.60	14.45*
Sterling(1) N15	12.50	14.30
Waukegan A7	12.50	14.05†
Worcester A7	12.80	....

* Based on 11c zinc; † 5c zinc; ** Subject to zinc equalization extras.

NAILS, Stock To dealers & mfrs. (7)	Col.
AlabamaCity,Ala. R2	131
Aliquippa,Pa. J5	131
Atlanta A11	133
Bartonville,Ill. K4	133
Chicago,Ill. W13	131
Cleveland A9	137
Crawfordsville,Ind. M8	133
Donora,Pa. A7	131
Duluth,Minn. A7	131
Fairfield,Ala. T2	131
Galveston,Tex. D7	139
Houston,Tex. S5	139
Johnstown,Pa. B2	131
Joliet,Ill. A7	131
KansasCity,Mo. S5	143
Kokomo,Ind. C16	133
Minnequa,Colo. C10	136
Monessen,Pa. P7	131
Pittsburg,Calif. C11	150
Rankin,Pa. A7	131
So.Chicago,Ill. R2	131
SparrowsPt.,Md. B2	131
Sterling,Ill. (1) N15	131
Worcester,Mass. A7	137

NAILS, CUT (100 lb keg) To dealers (33)	
Conshohocken,Pa. A3	$8.00
Wheeling,W.Va. W10	8.00

STAPLES, Polished Stock To dealers & mfrs. (7)	Col.
AlabamaCity,Ala. R2	133
Aliquippa,Pa. J5	133
Atlanta A11	135
Bartonville,Ill. K4	135
Crawfordsville,Ind. M8	135
Donora,Pa. A7	133
Duluth,Minn. A7	133
Fairfield,Ala. T2	133
Johnstown,Pa. B2	133
Joliet,Ill. A7	133
Kokomo,Ind. C16	135
Minnequa,Colo. C10	138
Monessen,Pa. P7	133
Pittsburg,Calif. C11	152
Rankin,Pa. A7	133
So.Chicago,Ill. R2	133
SparrowsPt.,Md. B2	135
Sterling,Ill. (1) N15	133
Worcester,Mass. A7	139

FENCE POSTS

	Col.
ChicagoHts.,Ill. C2 I-2	145
Duluth,Minn. A7 (49)	145
Franklin,Pa. F5	145
Johnstown,Pa. B2	145
Marion,O. P11	145
Minnequa,Colo. C10	150
Moline,Ill. R2	*150*
So.Chicago,Ill. R2	145
Tonawanda,N.Y. B12	145
Williamsport,Pa. S19	148

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv
Aliquippa, Pa. J5 (‡)	15.75	list	19.75	2.5	22.25	5	23.75	6.5	23.75	6.5	23	5.75	25.5	8.25
Ambridge, Pa. N2 (†)	15.75	...	19.75	...	22.25	...	23.75	...	23.75	...	23	...	25.5	...
Lorain, O. N3 (*)	15.75	4.5	19.75	5.5	22.25	8	23.75	9.5	23.75	9.5	23	8.75	25.5	11.25
Youngstown Y1 (††)	15.75	list	19.75	2.5	22.25	5	23.75	6.5	23.75	6.5	23	5.75	25.5	8.25

ELECTRIC WELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2 (**)	15.75	1.5	19.75	3.5	22.25	6.0	23.75	7.5	23.75	7.5	23	7.5	25.5	6.75

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼		1½	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c		27.5c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28		2.73	
	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv
Aliquippa, Pa. J5 (‡)	...	...	....	...	....	....	26.25	10	29.25	14	31.75	17.5	34.25	18.5	34.75	19.5
Alton, Ill. L1 (§)	...	...	....	...	....	....	24.25	9	27.25	13	29.75	16.5	32.25	17.5	32.75	18.25
Benwood, W.Va. W10(††)	25.5	+0.25	17.75	+5.5	10.25	+10	26.25	11	29.25	15	31.75	18.5	34.25	19.5	34.75	20.25
Butler, Pa. F6‡‡	26.5	list	19.5	+4	12.5	+9	....	..	....	..	....	...	....	....	....	....
Etna, Pa. N2 (†)	...	...	....	...	....	....	26.25	7	29.25	11	31.75	14.5	34.25	16.25	34.75	17.25
Fairless, Pa. N3	...	...	....	...	....	....	24.25	..	27.25	..	29.75	...	32.25	....	32.75	....
Fontana, Calif. K1 (§)	...	...	....	...	....	....	13.25	+3	16.25	1	18.75	4.5	21.25	5.5	21.75	6.5
Ind. Harbor Y1 (††)	...	...	....	...	....	....	25.25	9	28.25	13	30.75	16.5	33.25	17.5	33.75	18.5
Lorain, O. N3 (*)	...	...	....	...	....	....	26.25	16	29.25	20	31.75	23.5	34.25	23	34.75	24
Sharon, Pa. S4 (‡)	26.5	list	19.50	+4.00	12.5	+9	....	..	....	..	....	...	....	....	....	....
Sharon, Pa. M6	...	...	....	...	....	....	26.25	11	29.25	15	31.75	18.5	34.25	19.25	34.75	20.25
Sparrows Pt., Md. B2 (§)	24.5	+1.75	17.5	+6.25	10.5	+10.5	24.25	8	27.25	12	29.75	15.5	32.25	16.5	32.75	17.5
Youngstown R2 (**)	...	...	....	...	....	....	26.25	12	29.25	16	31.75	19.5	34.25	20	34.75	21
Youngstown Y1 (††)	...	...	....	...	....	....	26.25	10	29.75	14	31.75	17.5	34.25	18.5	34.75	19.5
Wheatland, Pa. W9 (§)	24.5	+1.75	17.5	+6.25	10.5	+10.5	26.25	10	29.75	14	31.75	17.5	34.25	18.5	34.75	19.5

Size—Inches	2		2½		3		3½		4	
List Per Ft	37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89	
	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv
Aliquippa, Pa. J5(‡)	35.25	20	36.75	20	36.75	20	....	....	....	....
Alton, Ill. L1 (§)	33.25	18.75	34.75	18	34.75	18	....	....	....	....
Benwood, W.Va. W10(††)	35.25	20.75	36.75	20.5	36.75	20.5	27.75	11	27.75	11
Etna, Pa. N2 (†)	35.25	17.25	36.75	18.5	36.75	18.5	27.75	9	27.75	9
Fairless, Pa. N3	33.25	....	34.75	....	34.75	...	25.75	....	25.75	....
Fontana, Calif. K1 (§)	22.25	7	23.75	7	23.75	7	....	....	....	....
Ind. Harbor, Ind. Y1 (††)	34.25	19	35.75	19	35.75	19	....	....	....	....
Lorain, O. N3 (*)	35.25	24.5	36.75	23	36.75	23	....	....	....	....
Sharon, Pa. M6	35.25	20.75	36.75	20.5	36.75	20.5	....	....	....	....
Sparrows Pt., Md. B2 (§)	32.25	18	34.75	18	34.75	18	25.75	8.5	25.75	8.5
Youngstown R2 (**)	35.25	21.5	36.75	21	36.75	21	27.75	11.5	27.75	11.5
Youngstown Y1 (††)	35.25	20	36.75	20	36.75	20	....	....	....	....
Wheatland, Pa. W9 (‡)	35.25	20	36.75	20	36.75	20	....	....	....	....

Galvanized pipe discounts based on zinc price of: (†), 14c; (‡), 11c to under 12c; (*), 5c; (§), 10c to under 11c; (††), 10.50c-11.50c; (**), 9.50c; with discounts adjusted on price of zinc at time of shipment; (‡‡), 11c.

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut length 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	19.02	18.44
1¼	13	....	22.53	18.12
1½	13	20.65	24.91	20.01
1¾	13	24.40	29.43	23.66
2	13	27.34	32.98	26.51
2¼	13	30.80	37.15	29.86
2½	12	33.43	40.32	32.41
2½	12	36.82	44.41	35.70
2¾	12	39.87	48.09	38.66
3	12	42.52	51.28	41.23

RAILWAY MATERIALS

	Std. No. 1	Std. No. 2	Std. All No. 2	Tee Rails 60 lb Under
RAILS				
Bessemer,Pa. U5	4.325	4.225	4.275	5.20
Ensley,Ala. T2	4.325	4.225	....	5.20
Fairfield,Ala. T2	....	....	....	5.20
Gary,Ind. U5	4.325	4.225	4.275	...
Huntington,W.Va. W7	....	....	....	5.20
IndianaHarbor,Ind. I-2	4.325	4.225	4.275	...
Johnstown,Pa. B2	....	....	...(16)	5.20
Lackawann,N.Y. B2	4.325	4.225	....	5.20
Minnequa,Colo. C10	4.325	4.225	....	5.70
Steelton,Pa. B2	4.325	4.225	....	...
Williamsport,Pa. S19	....	....	....	5.20

TIE PLATES

Fairfield,Ala. T2 .....5.125
Gary,Ind. U5 .....5.125
Ind.Harbor,Ind. I-2 ...5.125
Lackawanna,N.Y. B2..5.125
Minnequa,Colo. C10 ...5.125
Pittsburg,Calif. C11 ...5.275
Seattle B3 .....5.275
Steelton,Pa. B2 .....5.125
Torrance,Calif. C11 ...5 275

TRACK BOLTS (20) Treated

Cleveland R2 .. ..11.00
KansasCity,Mo. S5 ....11.00
Lebanon,Pa. B2 .. ...11.00
Minnequa,Colo. C10 ...11.00
Pittsburgh C3, P14 ...11.00
Seattle,Wash. B3 .....11.50

JOINT BARS

Bessemer,Pa. U5 .....5.275
Fairfield,Ala. T2 .....5.275
Ind.Harbor,Ind. I-2 ...5.275
Joliet,Ill. U5 .....5.275
Lackawanna,N.Y. B2 ..5.275
Minnequa,Colo. C10 ...5.275
Steelton,Pa. B2 .....5.275

AXLES

Ind.Harbor,Ind. S13 ....6.50
Johnstown,Pa. B2 .....6.50

STANDARD TRACK SPIKES

Fairfield,Ala. T2 .....7.05
Ind.Harbor,Ind. I-2, Y1.7.05
KansasCity,Mo. S5 .....7.30
Lebanon,Pa. B2 .....7.05
Minnequa,Colo. C10 ....7.05
Pittsburgh J5 .....7.05
Seattle B3 .....7.55
So.Chicago,Ill. R2 .....7.05
Struthers,O. Y1 .....7.05
Youngstown R2 .....7.05

RIVETS

F.o.b. Cleveland, and/or freight equalized with Pittsburgh, f.o.b. Chicago, and/or freight equalized with Birmingham except where equalization is too great.
Structural ½-in., larger 8.90c
⅞-in. under .....26.5 off

WASHERS, WROUGHT

F.o.b. shipping point, to jobbers ..... List

BOLTS, NUTS

CARRIAGE, MACHINE BOLTS
(F.o.b. midwestern plants, per cent off list for less than case lots to consumers)
6 in. and shorter:
½-in. & smaller diam. 4
⅝-in. & ⅝-in. 5
¾-in. and larger 3
Longer than 6 in.:
All diameters ..... +4
Lag bolts, all diams.:
6 in. and shorter..... 12
Over 6 in. long 8
Ribbed Necked Carriage 5
Blank 25
Plow 25
Step, Elevator, Tap and Sleigh Shoe 12
Tire Bolts .....List
Boiler & Fitting-Up Bolts 23

NUTS
H.P. and C.P., regular & heavy:
Square, all sizes 58
H.P., Hex, regular & heavy:
¾" and smaller 58
⅞" to 1⅛", inclusive.60
1¼" to 1½", inclusive 62
1⅝" and larger 58
C.P. Hex regular & heavy:
All sizes 58
Hot Galv. Nuts (all types):
¾" to 1½", inclusive. 40
⅞" to 1½", inclusive. 43
Finished Hex Nuts:
New standard, all sizes 58
Semifinished & Slotted Hex:
Regular and heavy, all sizes 58

SQUARE HEAD SET SCREWS
(Packaged; per cent off list)
1 in. diam. x 6 in. and shorter 34
1 in. and smaller diam. x over 6 in. 20

HEADLESS SET SCREWS
(Packaged; per cent off list)
No. 10 and smaller 34
¼ in. diam & larger.... 14
N.F. thread, all diams. 8

STEEL STOVE BOLTS
(F.o.b. plant, per cent off list in packages)
Plain finish .....47.5 x 10
Plated finishes .....30 x 10

HEXAGON CAP SCREWS
(1020 steel; packaged; per cent off list)
6 in. or shorter:
⅝-in. & smaller 38
¾-in. through 1 in. .. 22
Longer than 6 in.:
⅝-in. and smaller ... 20
¾-in. through 1 in. .. 7

METAL POWDERS

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as otherwise noted)

	Cents
Sponge Iron:	
98+% Fe, annealed.	18.00
Unannealed	
Minus 100 mesh ..	14.50
Minus 35 mesh ..	10.25
Minus 20 mesh ..	10.00
Swedish, c.l.f. N. Y., c.l., in bags	11.25
Domestic (Swedish), f.o.b. Riverton, N. J., in bags ...	11.25
Electrolytic iron:	
Melting stock, 99.91% Fe, irregular fragments of ⅛ in. x 1.3 in.	22.00
Annealed, 99.5% Fe.	36.50
Unannealed (99+% Fe)	32.50
Unannealed (99+% Fe) (minus 325 mesh)	52.00
Powder Flakes (minus 16, plus 100 mesh)..	31.00
Carbonyl Iron: 97.9-99.8% size 5 to 10 microns..83.00-148.00	
Aluminum: Atomized, 500 lb drums, frgt. allowed:	
Carlots	32.00
Ton lots	34.00
Antimony, 500 lb lots	32.00*
Brass, ¼-ton lots .....28.75-37.50†	
Bronze, ¼-ton lots .....31.00-39.00†	
Copper:	
Electrolytic 13.50*	
Reduced 13.50*	
Lead	7.50*
Manganese:	
Minus 35 mesh	61.00
Minus 100 mesh	67.00
Minus 200 mesh	72.00
Nickel, unannealed ...	89.50
Nickel-Silver, ¼-ton lots .....45.75§	
Nickel-Silver, ¼-ton lots 48.50**	
Phosphor-Bronze, ¼-ton lots	58.50
Silicon	43.50
Solder	8.50*
Stainless Steel, 302 ...	91.00
Tin 14.50*	
Zinc, ¼-ton lots.18.25-32.00‡	
Tungsten	Dollars
Melting grade, 99% 60 to 200 mesh:	
1000 lb and over....	4.95
Less than 1000 lb ..	5.10
Chromium electrolytic 99.2% Cr min.	3.50

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §70% Cu, 20% Zn, 10% Ni; **64% Cu, 18% Zn, 18% Ni.

Footnotes

(1) Chicago base.
(2) Angles, flat, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1⅛" to 1 7/16"; 1 7/16" to 1 15/16" 4.55c; 1 15/16" to 7 5/16" 4.95c.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 gage and heavier.
(9) 6 in. and narrower.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass. base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ⅝" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) 0.25c off for untreated.
(21) New Haven, Conn., base.
(22) Del. San Francisco Bay area.
(23) 20 Ga. 36" wide.
(24) Deduct 0.10c, finer than 15 Ga.
(25) Bar mill bands.
(26) Reinforcing mill lengths, to fabricators; to consumers, 5.40c.
(27) Bar mill sizes.
(28) Bonderized
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c for carbon and 0.35c for H.S.-L.A.
(31) Base; deld. within mill county.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 13 gage & lighter; 60" & narrower.
(38) 14 gage & lighter: 48" and narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(48) 6-7 gage.
(49) T-post; deduct 2 cols for U-post.

STAINLESS STEEL MILL PRICES

(Representative prices cents per pound; subject to current lists of extras)

AISI Type	Rerolling Ingots	Rerolling Slabs, Billets	Forging Billets	Seamless Tube Billets	Shapes; H.R. & C.F. Bars; H.R. Strip	Shapes; H.R. & C.F. Bars; Wire	Plates	Sheets	C.R. Strip; Flat Wire
301	16.25	20.50	29.50	34.25	29.75	35.25	37.25	41.25	38.25
302	17.25	22.75	29.75	34.50	32.00	35.50	37.50	41.50	41.50
302B	18.50	24.50	30.50	34.50	35.00	35.50	37.50	44.75	44.75
303	18.75	24.75	32.25	37.25	36.75	38.25	39.75	48.75	45.50
304	18.25	23.75	31.00	36.00	34.25	37.25	39.75	43.75	43.75
304L	....	....	36.75	....	....	42.75	45.25	49.00	49.00
308	19.50	25.50	....	36.25	37.00	37.50	42.00	51.75	46.75
308	19.75	26.25	35.25	40.75	38.00	42.00	46.00	48.00	48.00
309	26.50	34.75	43.25	49.25	49.25	50.50	53.75	62.00	62.00
309S	28.50	37.50	47.50	54.50	54.00	55.50	59.00	68.50	68.50
310	33.00	43.25	56.75	66.25	62.75	67.50	69.00	72.25	72.25
314	....	....	....	....	....	....	69.00	74.50	....
316	28.00	36.25	46.75	54.50	53.25	55.50	59.00	62.75	62.75
316L	....	....	52.50	....	58.25	61.00	64.25	67.75	67.75
317	33.00	43.50	58.25	66.75	67.50	68.25	70.75	77.00	77.00
318	33.50	44.00	56.25	64.50	66.25	65.50	68.75	80.25	80.25
321	22.75	29.50	35.25	40.75	41.00	42.00	46.00	50.50	50.50
330	....	....	....	58.00	....	....	68.50	70.00	73.75	77.75
347	24.50	32.25	39.50	45.75	46.50	46.75	51.25	59.25	59.25
403	....	....	....	27.00	30.75	....	32.00	34.25	44.00	41.25
405	16.50	21.75	25.25	29.25	30.50	30.25	31.75	39.75	39.75
410	14.00	18.25	24.00	27.75	26.25	28.75	30.00	34.25	34.25
416	....	....	24.50	28.25	....	29.25	30.50	41.25	41.25
420	22.00	28.50	29.25	34.00	35.50	35.00	38.50	52.75	52.75
430	14.25	18.50	24.50	28.25	27.00	29.25	30.50	34.75	34.75
430F	....	18.75	25.00	28.75	....	29.75	31.00	44.00	44.00
431	14.50	28.50	25.00	28.25	27.50	29.25	30.50	35.25	35.25
440A,B,C	....	28.50	29.25	34.00	....	35.00	38.50	49.25	52.75
442	....	....	....	28.00	....	....	30.50	35.25	48.25	47.75
446	....	....	....	33.75	38.25	50.25	39.50	40.75	59.75	59.75
501	....	....	....	14.00	14.50	21.25	16.00	18.25	29.00	29.00
502	....	....	....	15.25	16.00	22.25	17.00	20.00	30.00	30.00

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; Alloy Metal Wire Co. Inc.; American Steel & Wire Div., U. S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; G. O. Carlson Inc.; Carpenter Steel Co.; Charter Wire Products Co.; Cold Metal Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Ellwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg Warner Corp.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McLouth Steel Corp.; Metal Forming Corp.; McInnes Steel Co.; National-Standard Co.; National Tube Div., U. S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Rotary Electric Steel Co.; Sharon Steel Corp.; Sawhill Tubular Products Inc.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Superior Steel Corp.; Superior Tube Co.; Timken Roller Bearing Co.; Trent Tube Co., Tube Methods Inc.; Ulbrich Stainless Steels; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

CLAD STEEL

Cladding Stainless	Plates, Carbon Base 10%	Plates, Carbon Base 20%	Sheets, Carbon Base 20%	Sheets, Copper Base Both Sides
302	....	31.00	31.00	77.00
304	27.60	32.50-32.70	32.50	77.00
310	36.50	41.00	.....	144.00
316	32.60	37.70-42.75	42.75	....
318	37.00	42.20	.....	....
321	29.80	34.40-37.00	37.00	111.00
347	30.40	35.50-40.50	40.50	130.00
405	23.40	30.60	.....	....
410	22.90	30.10	.....	....
430	22.90	30.10	.....	....
Inconel	41.23	54.18	.....	165.00
Nickel	37.50	50.90	.....	....
Monel	38.90	51.80	.....	....
Copper*	....	.....	46.00	....

	Strip, Carbon Base, Cold-Rolled 10%	Strip, Carbon Base, Cold-Rolled Both Sides	Strip, Carbon Base, Hot-Rolled 10%	Strip, Carbon Base, Hot-Rolled Both Sides
Copper*	27.85	35.85	24.00	32.25

* Deoxidized. Production points: Stainless sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; Copper-clad strip, Carnegie, Pa. S18. Production point for copper-base sheets is Carnegie, Pa. A13.

TOOL STEEL

Grade	$ per lb	Grade	$ per lb
Regular Carbon	0.25	5% Cr Hot Work	0.39
Extra Carbon	0.30	W-Cr Hot Work	0.41
Special Carbon	0.355	V-Cr Hot Work	0.42-.43
Oil Hardening	0.37-.390	Hi-Carbon-Cr	0.665-.70

Grade by Analysis (%) W	Cr	V	Co	Mo	$ per lb
20.25	4.25	1.6	12.25	...	3.875
18.25	4.25	1	4.75	...	2.160-2.320
18	4	2	9	...	2.515
18	4	2	....	...	1.640
18	4	1	....	...	1.480
13.5	4	3	....	...	1.735
6.4	4.5	1.9	....	5	1.005-1.055
6	4	3	....	6	1.240
2	1.4	1.2	....	...	0.495
1.5	4	1	....	8.5	0.865-0.895

Tool Steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, J3, L3, M14, S8, U4, V2 and V3.

PIG IRON Gross Ton

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax.

	Basic	No. 2 Foundry	Malleable	Bessemer
Birmingham District				
AlabamaCity R2	52.38	52.88	....	....
Birmingham R2	52.38	52.88	....	....
Birmingham U6	....	52.88	....	....
Woodward,Ala. W15	52.38	52.88	56.50†	....
Cincinnati, del.	....	60.43	....	....
Buffalo District				
Buffalo R2, H1	56.00	56.50	57.00	....
Tonawanda,N.Y. W12	56.00	56.50	57.00	....
No.Tonawanda,N.Y. T9	....	56.50	57.00	....
Boston, del.	66.65	67.15	67.65	....
Rochester,N.Y., del.	59.02	59.52	60.02	....
Syracuse,N.Y., del.	60.12	60.62	61.12	....
Chicago District				
Chicago I-3	56.00	56.50	56.50	57.00
Gary,Ind. U5	56.00	....	56.50	....
IndianaHarbor,Ind. I-2	56.00	....	56.50	....
So.Chicago,Ill. W14, Y1	56.00	56.50	56.50	....
So.Chicago,Ill. U5	56.00	....	56.50	57.00
Milwaukee, del.	58.17	58.67	58.67	59.17
Muskegon,Mich., del.	....	62.80	62.80	....
Cleveland District				
Cleveland A7	56.00	56.50	56.50	57.00
Cleveland R2	56.00	56.50	56.50	....
Akron,O., del. from Cleve.	58.75	59.25	59.25	59.75
Lorain,O. N3	56.00	....	....	57.00
Mid-Atlantic District				
Bethlehem,Pa. B2	58.00	58.50	59.00	59.50
NewYork, del.	....	62.28	62.78	....
Newark, del.	61.02	61.52	62.02	62.52
Birdsboro,Pa. B10	58.00	58.50	....	....
Steelton,Pa. B2	58.00	58.50	59.00	59.50
Swedeland,Pa. A3	58.00	58.50	59.00	59.50
Philadelphia, del.	59.66	60.16	60.66	61.16
Troy,N.Y. R2	58.00	58.50	59.00	....
Pittsburgh District				
NevilleIsland,Pa. P6	56.00	56.50	56.50	57.00
Pittsburgh (N&S sides), Ambridge, Aliquippa, del.	57.37	57.87	57.87	58.37
McKeesRocks, del.	57.04	57.54	57.54	58.04
Lawrenceville,Homestead, Wilmerding,Monaca, del.	57.66	58.16	58.16	58.66
Verona,Trafford, del.	58.19	58.69	58.69	59.19
Brackenridge, del.	58.45	58.95	58.95	59.45
Bessemer,Pa. U5	56.00	....	56.50	57.00
Clairton,Rankin,So.Duquesne,Pa. U5	56.00	....	....	....
McKeesport,Pa. N3	56.00	....	....	57.00
Midland,Pa. C18	56.00	....	....	....
Monessen,Pa. P7	56.00	....	....	....
Youngstown District				
Hubbard,O. Y1	....	....	56.50	....
Sharpsville,Pa. S6	56.00	56.50	56.50	57.00
Youngstown Y1	....	....	56.50	57.00
Youngstown U5	56.00	....	....	57.00
Mansfield,O., del.	60.90	....	61.40	61.90
Duluth I-3	56.00	56.50	56.50	57.00
Erie,Pa. I-3	56.00	56.50	56.50	57.00
Everett,Mass. E1	60.75	61.25	61.75	....
Fontana,Calif. K1	62.00	62.50	....	....
Geneva,Utah C11	56.00	56.50	....	....
GraniteCity,Ill. G4	57.90	58.40	58.90	....
Ironton,Utah C11	56.00	56.50	....	....
LoneStar,Texas L6	52.00	52.50*	52.50	....
Minnequa,Colo. C10	58.00	59.00	59.00	....
Rockwood,Tenn. T3	....	....	56.50	....
Toledo,O. I-3	56.00	56.50	56.50	57.00
Cincinnati, del.	61.76	62.26	....	....

* Low phos. southern grade. † Phos., 0.30 max.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.

Phosphorus: Deduct 38 cents per ton for P content of 0.70% and over.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, incl., add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.0-6.50% silicon; add $1.50 for each 0.5% Si; 75 cents for each 0.5% Mn over 1%)

Jackson,O. G2, J1	$67.00
Buffalo H1	68.25

ELECTRIC FURNACE SILVERY PIG IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.45 for each 0.5% Mn over 1%; $2 per gross ton premium for 0.045% max P)

NiagaraFalls,N.Y. P15	$87.50
Keokuk,Iowa, Openhearth & Fdry, freight allowed K2	92.00
Keokuk, OH & Fdry, 12½ lb pigiets, 16% Si, frgt allowed K2	95.00
Wenatchee,Wash. OH & Fdry, freight allowed K2	92.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Cleveland, intermediate A7	$61.00
Rockwood,Tenn. T3	70.00
Steelton,Pa. B2	64.00
Philadelphia, del.	64.00
Troy,N.Y. R2	64.00

WAREHOUSE STEEL PRODUCTS

(Representative prices, cents per pound, subject to extras, f.o.b. warehouse. *City delivery charges are 20 cents per 100 lb except: New York, 30 cents; Philadelphia, 25 cents; Birmingham, Erie, St. Paul, 15 cents; Seattle and Spokane, Wash., no charge.)

	SHEETS				STRIP		BARS			Standard Structural Shapes	PLATES	
	Hot Rolled	Cold Rolled	Gal. 10 Ga.†	Stainless Type 302	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.‡	H.R. Alloy 4140††[5]		Carbon	Floor
Baltimore	6.20	7.12	7.78	....	7.00	...	6.86	8.17[6]	12.04	6.98	6.85	7.98
Birmingham	6.10	7.00	8.00[2]	....	6.30	...	6.15	8.90	....	6.35	6.35	8.25
Boston	6.89	7.83	9.18	44.78	7.13	...	6.87	8.35	12.13	7.06	7.13	8.26
Buffalo	6.11	7.10	8.65	....	6.50	...	6.27	7.65	11.97	6.49	6.45	7.80
Charlotte, N. C.	6.95	7.80	8.69	....	6.90	...	7.10	8.37	....	7.10	7.10	8.37
Chicago	6.18	7.12	7.95	....	6.42	...	6.28	7.30	11.60	6.46	6.33	7.46
Cincinnati	6.30	7.11	8.00	50.80	6.66	...	6.52	7.60	11.85	6.93	6.62	7.71
Cleveland	6.18	7.12	8.25	45.74	6.58	...	6.34	7.40	11.74	6.79	6.50	7.63
Detroit	6.38	7.29	8.22	....	6.69	7.36	6.56	7.60	11.97	6.91	6.80	7.80
Erie, Pa.	6.15	...	8.25	....	6.45	...	6.28	7.25[4]	....	6.46	6.33	7.46
Houston	7.15	7.60	9.23	....	7.45	9.30	7.45	9.30	....	7.35	7.20	8.55
Los Angeles	7.25	9.00	8.85	50.15	7.55	11.20	7.15	9.10	12.90	7.35	7.20	9.25
Milwaukee	6.35	7.29	8.12	....	6.59	...	6.45	7.57	11.77	6.63	6.50	7.63
Moline, Ill.	6.53	7.47	8.30	....	6.77	...	6.63	7.65	....	6.81	6.68	...
New York	6.78	7.52	8.37	44.15	7.16	...	7.06	8.43[6]	11.99	6.90	6.99	8.30
Norfolk, Va.	6.90	...	...	....	7.00	...	7.00	8.50	....	7.00	7.00	7.85
Philadelphia	6.35	7.13	7.87	41.98[9]	7.02	8.80	6.87	8.19[6]	11.74	6.67	6.63	7.66**
Pittsburgh	6.18	7.12	8.00	50.50	6.55	...	6.28	7.65	11.60	6.46	6.33	7.46**
Portland, Oreg.	7.60	8.45	9.05	....	7.65	...	7.35	10.65	....	7.25	7.25	9.15
Richmond, Va.	6.50	...	8.67	....	7.10	...	7.05	8.20	....	7.10	6.85	8.20
St. Louis	6.48	7.42	8.25	43.89	6.72	...	6.58	7.70	11.90	6.86	6.73	7.86
St. Paul	6.84	7.78	8.61	....	7.08	...	6.94	8.06	....	7.12	6.99	8.12
San Francisco	7.35	8.70	8.95	50.15	7.60	...	7.15	9.75	12.90	7.25	7.20	9.25
Seattle	8.15	9.50	9.80	50.50	8.00	...	7.60	10.65	13.35	7.50	7.60	9.40
Spokane	8.15	9.40[7]	9.80	....	7.60	...	7.60	10.55[8]	14.10	7.25	7.35	9.40
Washington	6.71	7.65	8.35	....	7.51	...	7.37	8.43	....	7.49	7.36	8.49

*Prices do not include gage extras; †prices include gage and coating extras, except Birmingham (coating extra excluded) and Los Angeles (gage extras excluded); ‡includes 35-cent special bar quality extra; §as rolled; **⅛-in. and heavier; ††as annealed. Base quantities, 2000 to 9999 lb except as noted: Cold-rolled strip and cold-finished bars, 2000 lb and over, except in Seattle where base is 2000 to 9999 lb; stainless sheets, 8000 lb except in New York and Boston where base is 10,000 lb. [2]—500 to 9999 lb; [4]—4000 lb and over; [5]—1000 to 1999 lb; [6]—1000 lb and over; [7]—1500 lb to 3999; [8]—under ½ in.; [9]—f.o.b. local delivery in lots of 10,000 lb and over.

Vacations Cut Warehouse Steel Sales

Distributors expect little change in market conditions over the next several weeks. Prices may be revised following present wage negotiations between producers and union

Cleveland — Approaching holiday and vacation season are reflected in a noticeable slackening of demand at warehouses in this area. Orders are reported fairly numerous, but are relatively small in volume. Expectations are there will be little change in market conditions over the next several weeks though the outcome of the steel-labor negotiations may result in some price revisions should mill quotations be affected in the settlement.

Pittsburgh—Much of the sales fluctuation of this spring has disappeared and the market is considered more stable by warehousemen. As some fabricators close down in July for vacations, a moderate decline may be expected. This is not likely to be very noticeable this year since most fabricators have low inventories and must continue purchasing at regular intervals.

Incoming orders are high in number, but dollar volume remains low. Reports continue of price-cutting in competition with low prices offered on secondary sheet and strip.

Philadelphia—Distributors of diversified lines of steel are experiencing a dull month, though some doubt if over-all volume will be down much from that of May. Meanwhile, price cutting continues, particularly shading of extras. Merchant pipe specialists are knocking 10 and 15 per cent off cards on various items.

Chicago—With the approaching July 4 holiday, steel warehouses see a lower demand for their products being ushered in for at least 60 days. Widespread closing of manufacturing plants for vacation periods add up to a shrinkage in volume. But this is a seasonal situation.

Cincinnati — Purchases of warehouse steel are going along at a good pace here. There is virtually no hedge buying taking place. Sales gains made in May are being held in June.

Boston—Continued shrinkage in warehouse volume is expected over

STEEL IMPORT PRICES

(Base, per 100 lb, landed, duty paid)

	North Atlantic	South Atlantic	Gulf Coast	West Coast*
Deformed Bars, Intermediate, ASTM-A-305	$4.75	$4.75	$4.70	$5.03
Bar Size Angles	4.50	4.50	4.40	4.73
Structural Angles	4.50	4.50	4.40	4.73
I-Beams	4.50	4.50	4.40	4.73
Wide Flange Beams	4.80	4.80	4.80	5.08
Sheet and Plate, 10 gage, 11 gage, 5' x 10'	5.50	5.50	5.45	5.78
Furring Channels, C.R., 1000 ft, ¾ x 0.30 lb per ft	25.50	25.70	25.50	26.34
Barbed Wire	6.75	6.75	6.75	7.08
Merchant Bars	6.75	4.75	4.70	5.03
Hot-Rolled Bands	4.90	4.90	4.85	5.18
Wire Rods, Thomas Commercial No. 5	4.77	4.84	4.82	5.09
Wire Rods, O-H, Cold Heading Quality No. 5	5.23	5.30	5.28	5.55
Bright Common Wire Nails, 8d	6.85	6.95	6.90	7.15

*Not including $2.20 per net ton customarily charged in most West Coast ports for wharfage and handling.

Size O.D.	Wgt/Foot/Lb	Gulf Port	West Coast	Vancouver
Seamless A.P.I. Casing, Grade J-55:				
5½ in.	15.5	$1.47/ft	$1.51/ft	$1.32/ft
7 in.	23	2.10/ft	2.17/ft	1.90/ft
Seamless N-80 Casing:				
5½ in.	17	1.94/ft	2.00/ft	1.75/ft
7 in.	23	2.50/ft	2.70/ft	2.36/ft
Seamless J-55 Tubing:				
2⅜ in.	4.7	0.60/ft	0.63/ft	0.55/ft
2⅞ in.	6.5	0.80/ft	0.83/ft	0.73/ft

Sources of shipment: Western continental European (Schuman Plan) countries.

the next six weeks. June is off slightly as compared with May. Although distributors have shaken down top-heavy inventories during the first half of the year stocks of some slow moving products are still relatively high.

Stainless volume has dropped and most alloys are inclined to lag. Distributors will take in less steel next month. Highly competitive selling tends to soften prices, notably merchant steel pipe.

Seattle—Warehouses report business somewhat improved. In part this is attributed to scare buying occasioned by threatened strikes in the lumber, logging and shipyard industries. Prices in the Seattle area continue steady and unchanged, but in Portland, cut prices still are contributing to a mixed and unsatisfactory situation.

Los Angeles — Distributors report second quarter sales volume was 5 to 10 per cent higher than first quarter. Flat-rolled inventories are unbalanced. Demand for wide-flange beams continues strong.

Plates . . .

Plate Prices, Page 154

Boston—Best delivery offered is frequently the deciding factor in plate buying, and, with eastern mills supplying this area able to make prompt shipment there is a scramble for the limited tonnage sought. Plate fabricators question the possibility of any price increase holding up under the present competitive selling. Among plate fabricators competition has weakened prices for finished work, notably weldments and small tanks. Shipyard requirements will be heavier by late third quarter, first for naval ships, and later for vessels included in various shipbuilding programs under consideration.

Philadelphia—Operations of district plate mills lag, with little improvement in early prospect. Some look for a further drop in bookings before an upturn sets in—an upturn which they hope will develop by late summer. Meanwhile, carbon plates can be had for shipment within 10 days to two weeks, and in some cases even less. The Claymont, Del., producer is placing its smaller mill back in operation.

Pittsburgh—Second half sales predictions are encouraging. Vacation slowdowns are expected to have a minor effect on plate shipments.

Seattle — Plates continue in good demand, although large tonnage jobs are lacking. Bethlehem Pacific Coast Steel Corp. will furnish in excess of 1200 tons of sheet piling for Alaska construction.

Republic Extending Delivered Pricing

Effective July 1, reinforcing bars, plates and structurals are added to the list of items sold on delivered basis. Prices quoted do not reflect freight allowances in any way.

Cleveland—Effective July 1, Republic Steel Corp. is extending delivered pricing to new billet reinforcing bars, plates and structurals.

This brings the list of Republic products now sold on a delivered basis to five, hot-rolled carbon bars having been placed on this basis last December, and cold-finished carbon bars on May 24 this year.

Under the new schedule for reinforcing bars, base prices per 100 pounds are established at five points as follows: Buffalo $4.18, Chicago $4.22, Cleveland $4.21, Gadsden, Ala., $4.18 and Youngstown $4.20.

Base prices for plates are set up at six points as follows: Buffalo $4.13, Chicago $4.17, Cleveland $4.16, Gadsden, Ala. $4.13, Warren, O. $4.14, and Youngstown $4.15.

One base is set up for structurals and small shapes. This is Gadsden at which structurals are quoted $4.13 and small shapes $4.18.

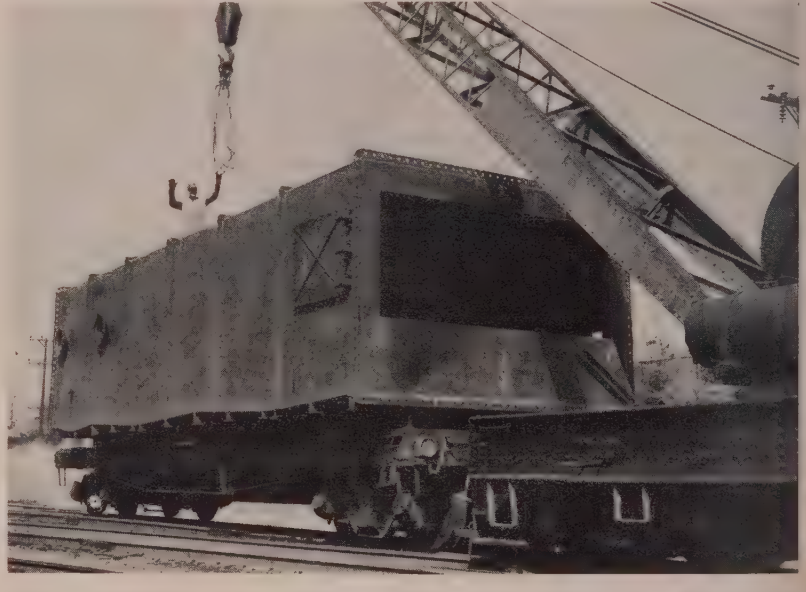
Because of the peculiarities of railroads tariffs Republic is issuing a supplemental county symbol list to cover reinforcing bars in lengths over 35 feet for shipment within Official territory.

In the North the 80,000-pound rail rate can not be used to ship reinforcing bars over 35 feet long or plates of any size.

Consequently, when plates are delivered from any of Republic's mills except Gadsden, Ala., the added cost for 40,000 pound rail delivery as shown in the company's county symbol list must be added. Plates can be delivered from Gadsden at the 80,000 and 40,000 pound rates as shown in the county symbol list.

Reinforcing bars over 35 feet long can be delivered in the North only at the 40,000 pound rate that prevailed generally for steel mill products prior to Mar. 26, 1954. The extra cost for this rate level is shown to selected destinations on the supplemental county symbol list which is being sent to reinforcing bar customers, but is available to all others on request.

In announcing extension of de-



B. F. Goodrich Co. Assembling Huge Pickling Machine

This steel tank, ready for unloading at B. F. Goodrich Co.'s Akron plant, is a section of what will be one of the largest spray pickling and washing machines ever made. The tank section weighs 25,000 lb. When completely assembled, the pickling and washing machine will weigh 200,000 lb and will measure 158 ft long, 12 ft wide and 8 ft high. The tank will be rubber-lined to protect the steel from sulphuric acid which is sprayed on metal parts to remove scale

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—knocked out in battle by ou superior armored might.

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Foremost Producer of

ARMOR PLATE FOR ORDNANCE

Building tank armor plate has been our dedicated task since the start of the defense program. With the splendid cooperation of the Ordnance Department and our customers, the prime contractors, we have been able to turn out an imposing tonnage. We are still the most active producer of tank armor in the field.

Here is how we work. With the aid of a staff of specialists at our Armor Plate Headquarters in Detroit, we engineer the parts for the most economical production and fabrication. We design the tooling, procure the material, inspect all along the line and expedite delivery.

Our manufacturing facilities, built up over many years, embrace a highly competent, fully staffed and equipped group of plants.

From such carefully coordinated activities, a steady flow of flat, formed, fully machined, and subassembled tank armor has reached all major tank producers.

This program will be continued until America's defenses have reached such stature as to repel the threat of any and all aggressors.

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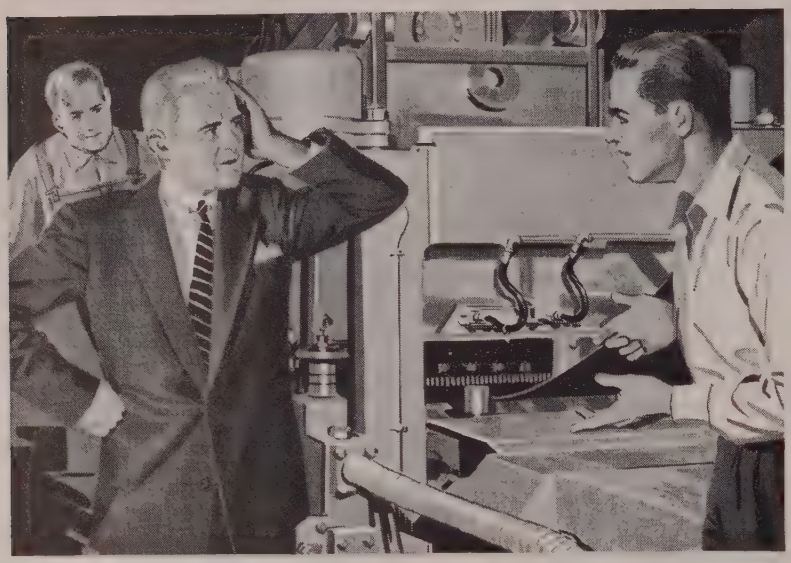
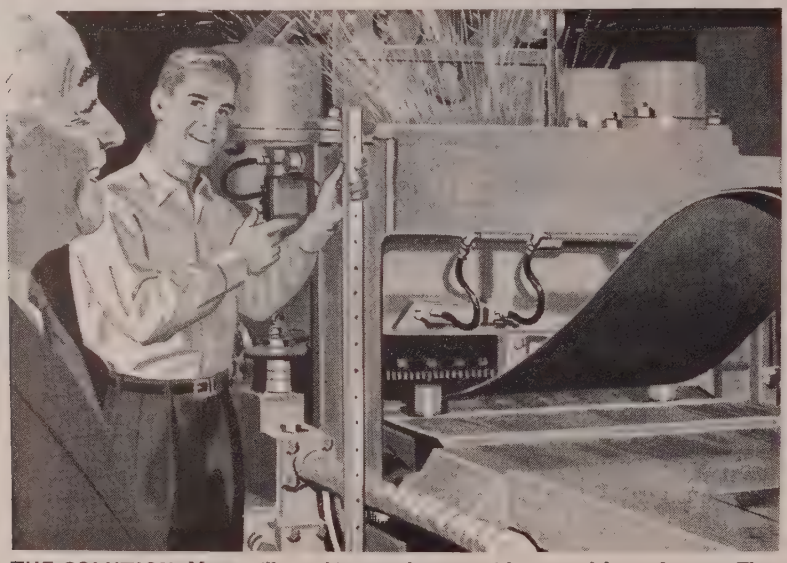


THE PROBLEM. Massive flash welders like this are the key to mile-a-minute production of steel strip. They join wide coils together so that they may be continuously fed into the pickling operation. Welders used to be equipped with solid dies made of various electrode materials, but the results were far from satisfactory. The dies picked up flash, and required frequent dressing. They wore rapidly or even fractured under the heavy pounding. Result: heavy maintenance costs, excessive downtime, lowered production.



THE SOLUTION. Many mills, seeking a way to minimize such interruptions and their bad effect on over-all operations, have now redesigned their flash welder dies. The solid die has been replaced by an assembly which uses a fitted insert or electrode made of tough wrought Berylco beryllium copper. The Berylco inserts are capable of taking heavy punishment and do not fracture. They wear better. Flash adherence is reduced, and thus dressings are less frequent. Maintenance costs are down, production is up, and with it all welds are smoother and sounder. Only Berylco, with its combination of electrical conductivity and ruggedness, could have made such results possible.

THIS IS A TYPICAL ILLUSTRATION of Berylco's ability to cut maintenance costs to the bone. The same success might be cited in such products as business machines and home appliances, where beryllium copper parts, large and small, assure continuous customer satisfaction and eliminate expensive service calls. Plan now to build service-free performance into your product with Berylco. For sample material or engineering help, write THE BERYLLIUM CORPORATION, Dept. 4F, Reading 19, Pa.

Tomorrow's products are planned today—with Berylco beryllium copper

livered pricing to additional products, Republic points out that the delivered prices derived from its county symbol list and its base price listings are Republic's prices alone. They do not in any way reflect freight allowances which may be required to make the company's prices competitive at some destinations.

Sheets, Strip . . .

Sheet and Strip Prices, Page 154 & 155

New York—Cold-rolled sheet demand is steady, possibly a shade better than it has been. At the same time, inquiry for hot-rolled sheets is definitely stronger, with tank manufacturers and warehouses specifying more freely. Deliveries are a bit more extended. One producer now quotes hot-rolled on a four weeks basis compared with two or three weeks only a short time ago.

There is a definite pickup in demand for secondary sheets, probably for the reason buyers haven't been getting them from the mills in anything like the volume of several weeks ago. Stainless sheets are moving well among the specialties.

Boston—Sheet and strip consumers are buying only enough tonnage to meet current reduced production schedules. Not until late third quarter will requirements be anticipated in most cases. Galvanized excepted, users can obtain shipments on flat-rolled products well within 30 days. Most producers are in August or beyond on galvanized. Another 100 million bushel corn storage bin program will tighten that grade. Competition in electro-coated sheets is sharp. There are several new finishes offered on which producers are competing for the market.

Philadelphia—Due primarily to a sustained, if not a slightly improved demand from manufacturers of household appliances, and a somewhat better movement to warehouses, district sheet business is more than holding its own. This applies not only to hot-rolled and cold-rolled sheets, especially the former, but also to galvanized, which reflects construction activity and closely affiliated air-condiitoning work.

Pittsburgh—Little change is reported in the market except in galvanized sheets. Prospects are production will again increase soon. In cold-finished sheets the immediate outlook is for a production decline. July sales will be affected by vacations at consuming plants. In August automakers may begin model changeovers, cutting sheet requirements.

Cleveland — Expectations are any wage advance granted the steel-

workers will be passed along in higher prices to consumers, though, in view of the highly competitive market prevailing some sellers question whether price advances will stick very long.

At any rate, so far as sheets are concerned the matter of higher prices at this time is entirely in the realm of speculation since producers are keeping their own counsel on policy until settlement of the wage question.

Los Angeles—With most consumers generally well stocked, fabricators display only mild interest in sheets. Producers expect inquiries to rise after the usual summer letdown.

Steel Bars . . .

Bar Prices, Page 154

Boston—Orders placed for carbon and alloy bars beyond July are small. While some consumers advanced July orders for June delivery, bookings this month of several leading producers failed to reach May totals. Forge shops are buying for current needs and can narrow shipments down to under two weeks. Producers of screw machine products and fasteners also follow this pattern. Purchasing departments are covering operating requisitions only, bargaining for best delivery.

New York—There is some improvement in demand for hot-rolled carbon bar angles and small and narrow flats. Inquiry for wider flats, rounds and squares, however, is slow and, in fact, the over-all situation in hot-rolled carbon bars is still lagging badly. Business in cold-drawn bars, particularly carbon grades, remains fairly good.

Philadelphia—In hot-rolled carbon bars, heavier flats and rounds appear in best demand. However, hot bars generally remain spotty, and this applies to alloy as well as carbon grades. Cold-drawn bar business is relatively much better than trading in hot bars, and deliveries are more extended. Better demand from the warehouses is contributing to the stronger market for cold-drawn material.

Pittsburgh—Bar sales are lagging. Some improvement could come if defense demand increases in second half of the year, but prospects are shipments will decline further during the summer.

Cleveland — Demand for merchant bars is running along at about the same pace as in recent weeks. Here and there consumers are ordering a little larger volume but in general buying continues limited to needs. Recently, there has been some slight improvement in demand for cold-drawn bars. For the most part, lit-

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tle, if any, change in the market is anticipated until late summer since vacation curtailments and suspensions will serve to extend the period of consumer stock liquidation.

Chicago—For some barmakers, July demand doesn't look as strong as June business. Accordingly, there will be some staggering of bar mill operations in July and August to provide mass vacations for crews.

Los Angeles—Signs point to a rising tempo of aircraft production, with subcontractors being called in to bid on new parts. Bar producers anticipate active business in third quarter from aircraft fabricators.

Pig Iron . . .

Pig Iron Prices, Page 158

Philadelphia—Movement of merchant pig iron over the next couple of weeks will reach the lowest point this year. Assuming no steel strike, the dip will result from a combination of poor business at most foundries and widespread suspensions for mass vacations. Even after this period, shipments should lag behind recent volume throughout the greater part of the summer as there is little new work in prospect and there will still be some shops with vacation suspensions ahead of them.

While little new buying of imported iron is noted, 5440 tons of iron arrived at this port in May, including 1988 tons of German iron from Hamburg for a Delaware river pipemaker. Remaining imports comprised one lot of 2000 tons and another of 1300, both from Rotterdam, and 152 tons from Bilbao, Spain.

Boston—Shipments are at a low point for this year. Foundry and steelworks melt is down, partially due to vacation suspensions. Backlogs with most shops are low.

Textile mill equipment foundries are not operating better than 40 to 50 per cent of postwar increase in capacity.

Several larger consumers in this group installed "automatic" foundries that increase capacity 50 to 100 per cent.

Machine tool builders need fewer castings with orders down. Backlog with The Bullard Co., Bridgeport milling machine builder, however, holds at high level. New Bullard $6 million foundry to be built shortly is the largest expansion in this area in years.

New York—Pig iron producers look for district shipments over the next two weeks to reach the lowest point so far this year. This is based on proposed widespread suspensions among foundries for mass vacations.

The Gripco Lock Nut one-piece design gives a tighter more positive holding action for faster application at less cost. And for 50 years the Gripco locking feature has proven itself by an ever increasing use. All-one-piece to cut initial cost—(no inserts, outside devices or complicated features) — the extreme holding or locking action is produced by a simple, vertical thread deflection. For stress, wear or vibration, a Gripco Lock Nut will hold tighter, wear longer. Impervious to oil or water. Write for samples and full details.

GRIPCO PRODUCTS INCLUDE:
Gripco Lock Nuts, New Gripco "Clinch" Nuts, Gripco Hi-Nuts, Gripco Pilot-Projection and Countersunk Weld Nuts with or without Gripco locking feature.

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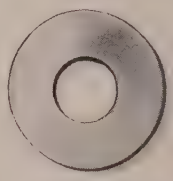

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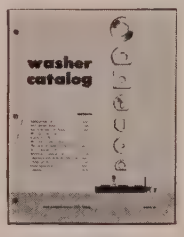

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Moen & Connell Avenues
Joliet, Illinois
★

which will fall particularly in the 4th of July holiday week. There will be some snapback after that but operations will be on a restricted basis for several weeks as not all foundries will be suspending in the immediate future.

Buffalo—Mixed tendencies prevail in the merchant pig iron market here. Foundry melt is not good.

Cleveland—Spotty foundry operations continue with the result merchant pig iron still is moving at sluggish pace. Still further decline in demand is in prospect over coming weeks as foundries close down or curtail operations for vacations.

Cincinnati—Return of the machine tool industry in Cincinnati to a 40-hour week is having its effect on foundries associated with the industry. Fewer castings are required than at any time in the past decade.

Chicago—For July and August, pig iron demand is a question mark. Foundry operations currently are spotty, ranging from three days to five or better, depending upon end use of the castings. Little upturn is expected in the next 60 days.

Iron Ore . . .

Iron Ore Prices, Page 169

Cleveland—Iron ore consumption during May was up slightly from that of April but was off sharply compared with May a year ago.

May consumption this year amounted to 5,375,748 gross tons, comparing with 5,286,731 tons in April, and with 8,358,260 tons in May, 1953.

This year through May consumption of Lake Superior ores amounts to 29,376,625 gross tons, a decline of 10,691,715 tons compared with consumption of 40,068,340 last year.

Stocks of lake ore on lower lake docks and at furnaces on June 1 amounted to 29,562,503 gross tons. This was an increase of 3,420,372 tons compared with the 26,142,131 tons on hand on May 1. On June 1 a year ago stocks totaled 26,247,318 gross tons.

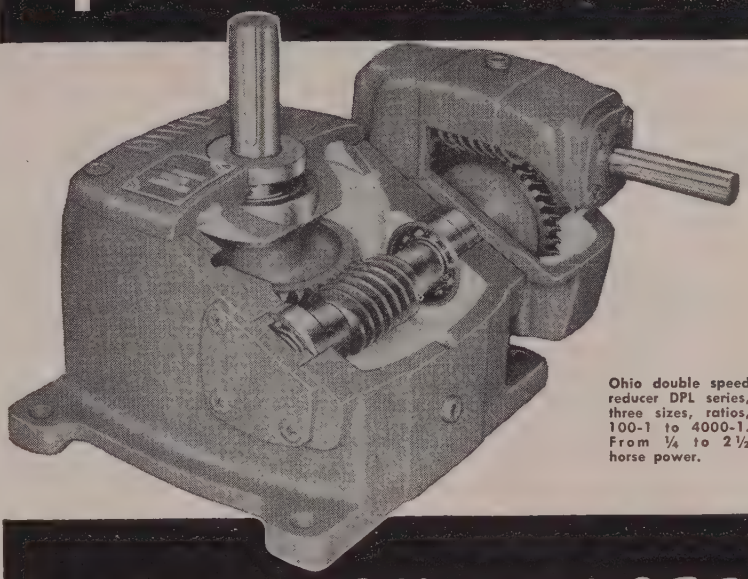
Of the 204 blast furnaces in this country and Canada only 128 were in blast on June 1.

Combined shipments of iron ore, coal and grain on the Great Lakes in May totaled 17,592,142 net tons, lowest for the month since 1946.

Ore moved amounted to 9,951,556 gross tons compared with 13,596,829 hauled in May last year.

Shipments of Lake Superior iron ore in the week ended June 21 totaled 2,471,698 gross tons, bringing the cumulative total for the 1954 season to 18,652,094 tons.

LOOK INTO YOUR
Speed Reducer Cost



Ohio double speed reducer DPL series, three sizes, ratios, 100-1 to 4000-1. From ¼ to 2½ horse power.

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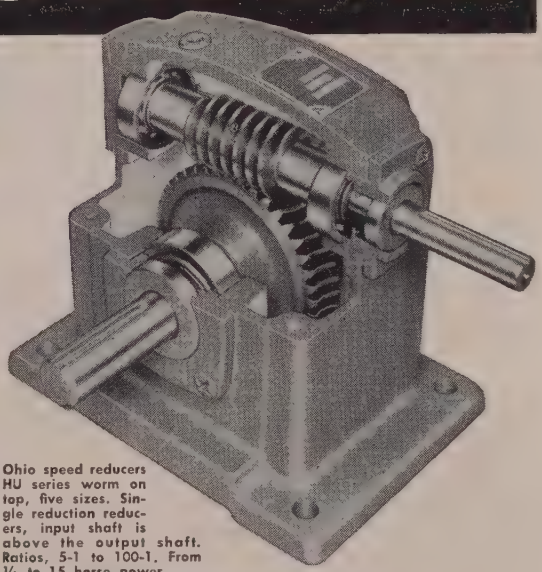

Ohio speed reducers HU series worm on top, five sizes. Single reduction reducers, input shaft is above the output shaft. Ratios, 5-1 to 100-1. From ¼ to 15 horse power.

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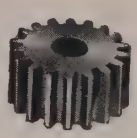
OHIO GEARS



THE OHIO GEAR COMPANY, 1359 East 179th St., Cleveland 10, Ohio

CURRENT FERROALLOY QUOTATIONS

Prices as reported to STEEL

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si). Carlot per gross ton $86, Palmerton, Pa.; $87 Clairton and Duquesne, Pa.
(16 to 19% Mn) $84 per ton, Palmerton, Pa.; $85 per ton, Clairton and Duquesne, Pa.

Standard Ferromanganese: (Mn 74-76%, C 7% approx.) Base price per net ton $200, Clairton, Duquesne, Johnstown and Sheridan, Pa.; Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; and Portland, Oreg.; add or subtract $2.00 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively.

(Mn 79-81%) Lump $208 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 76%, fractions in proportion to nearest 0.1%.

Low-Carbon Ferromanganese, Regular Grade: (Mn 85-90%). Carload, lump, bulk, max, 0.07% C, 27.95c per lb of contained Mn, carload packed 28.7c, ton lots 29.8c, less ton 31.0c. Delivered. Deduct 0.5c for max 0.15% C grade from above prices, 1c for max 0.30% C, 1.5c for max 0.50% C, and 4.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85% C 1.5% max). Carload, lump, bulk 21.35c per lb of contained Mn, carload packed 22.1c, ton lot 23.2c, less ton 24.4c. Delivered. Spot, add 0.25c.

Manganese metal, 2" x D (Mn 95.5% min, Fe 2% max, Si 1% max, C 0.2% max); Carload, lump, bulk, 36.2c per lb of metal; packed, 36.95c; ton lot 38.45c; less ton lots 40.45c. Delivered. Spot, add 2c.

Electromanganese: Min. carloads, 30c; 2000 lb to min carloads, 35c; 250 lb to 1999 lb, 34c; less than 250 lb, 37c. Premium for hydrogen-removed metal, 1.5c per lb, f.o.b. cars, Knoxville, Tenn. Freight allowed to St. Louis or to any point east of Mississippi.

Silicomanganese: (Mn 65-85%). Contract, lump, bulk, 1.50% C grade, 18-20% Si, 11.00c per lb of alloy, carload packed, 11.75c, ton lots 12.65c, less ton 13.65c. Freight allowed. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade, Si 12-14.5%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lots 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lots $1.35, less ton $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $177 per net ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%). Contract $195 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, C.l., lump, bulk 24.75c per lb of contained Cr; c.l. packed 25.65c, ton lot 26.80c, less ton 28.20c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%). Contract, carload, lump, bulk, max, 0.025% C (Simplex) 34.50c per lb contained Cr, 0.03% C 36.50c, 0.04% C 35.50c, 0.06% C 34.50c, 0.10% C 34.00c, 0.15% C 33.75c, 0.20% C 33.50c, 0.50% C 33.25c, 1% C 33.00c, 1.50% C 32.85c, 2% C 32.75c. Carload packed add 1.1c, ton lot 2.2c, less ton add 3.9c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%). Contract, c.l. 8 M x D, bulk, 26.25c per lb contained Cr. Packed, c.l. 27.15c, ton 28.50c, less ton 30.25c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, Low-Carbon: (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carload, packed, 8 M x D, 18.35c per lb of alloy; ton lot 19.2c; less ton lot, 20.4c, delivered; spot, add 0.25c.

Low-Carbon Ferrochrome Silicon: (Cr 34-41%, Si 42-49%, C 0.05% max). Contract, carload, lump, 4" x down and 2" x down, bulk, 24.75c per lb of contained chromium plus 10.8c per pound of contained silicon; 1" x down, bulk 25.25c per pound of contained chromium plus 11c per pound of contained silicon. F.o.b. plant; freight allowed to destination.

Chromium Metal: (Min 97% Cr and 1% Fe) contract, 1" x D; packed, max 0.50%, carload $1.12, ton lots $1.14; less ton $1.16. Delivered. Spot, add 5c. Prices on 0.10 per cent carbon grade, add 4c to above prices.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth Grade (V 35-55%, Si 8-12% max, C 3-3.5% max). Contract, any quantity, $3.00 per lb of contained V. Delivered. Spot, add 10c. **Crucible-Special Grades** (V 35-55%, Si 2-3.5% max, C 0.5-1% max). $3.10. **Primos and High Speed Grades** (V 35-55%, Si 1.50% max, C 0.20% max) $3.20.

Grainal: Vanadium Grainal No. 1, $1 per lb; No. 6, 68c; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lots $1.28 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.0c per lb of contained Si, packed 21.40c; ton lot 22.50c f.o.b. Niagara Falls, freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 10.80c per lb of contained Si, carload packed 12.40c, ton lot 13.85c, less ton 15.5c. Delivered. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.7c to 50% ferrosilicon prices.

65% Ferrosilicon: Contract, carload, lump, bulk, 12.2c per pound contained silicon; carload packed 13.55c; ton lots, 14.75c; less ton, 16.1c, delivered. Spot, add 0.35c.

75% Ferrosilicon: Contract, carload, lump, bulk, 13.8c per lb of contained Si, carload packed 15.1c, ton lot 16.25c, less ton 17.5c. Delivered. Spot, add 0.8c.

90-95% Ferrosilicon: Contract, carload, lump, bulk, 17.0c per lb of contained Si, carload packed 18.2c, ton lot 19.15c, less ton 20.2c. Delivered. Spot, add 0.25c.

Silicon Metal: (Mn 97% Si and 1% max Fe) C.l. lump, bulk, regular 18.5c per lb of Si, c.l. packed 19.7c, ton lot 20.6c, less ton 21.6c. Add 0.5c for max, 0.10% calcium grade. Deduct 0.5c for max 2% Fe grade analyzing min 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe) Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.25c per lb of alloy, ton lots packed 10.15c, 200 to 1999 lb 10.50c, smaller lots 11c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 30-43%, Fe 40-45%, C 0.20% max). Contract, c.l. lump, bulk 8.0c per lb of alloy, c.l. packed 8.75c, ton lot 9.5c, less ton 10.35c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 20.25c per lb of alloy, ton lot 21c, less ton 22.25c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy. Less than 100 lb $1.30. Delivered, spot add 5c. F.o.b. Washington, Pa., prices, 100 lb and over are as follows: Grade A (10-14% B) 85c per pound; Grade B (14-18% B) $1.20; Grade C (19% min M) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si), $5.25 per lb contained B, delivered to destination.

Bortam: (B 1.5-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 1 to 2%) Contract, lump, carloads 9.50c per lb, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 20.0c per lb of alloy, carload packed 20.8c, ton lot 22.3c, less ton 23.3c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Contract, carload, lump, bulk 19.0c per lb of alloy, carload packed 20.2c, ton lot 22.1c, less ton 23.6c. Deld. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3¾ lb each and containing exactly 2 lb of Cr). Contract, carload, bulk, 16.25c per lb of briquet, carload packed 16.95c, ton 17.75c, less ton 18.65c. Deld. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk 12.45c per lb of briquet, c.l. packaged 13.25c, ton lot 14.05, less ton 14.95c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 12.65c, per lb of briquet, c.l. packaged 13.45c, ton lot 14.25c, less ton 15.15c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing exactly 2 lb of Si). Contract, carload, bulk 6.3c per lb of briquet. Packed c.l. 7.10c, ton lot 7.9c, less ton 8.8c. Delivered. Spot, add 0.25c.

(Small size—Weighing approx. 2½ lb and containing exactly 1 lb of Si). Carload, bulk 6.45c. Packed c.l. 7.25c, ton lot 8.05c, less ton 8.95c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) $1.14 per pound of Mo contained, f.o.b. Langeloth, Pa.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%), 5000 lb W or more $3.80 per lb of contained W; 2000 lb W to 5000 lb W, $3.90; less than 2000 lb W, $4.02, f.o.b. Niagara Falls, N. Y.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 56-60%, Si 8% max. C 0.4% max). Contract, ton lot, 2" x D, $9.50 per lb of contained Cb, less ton $9.55. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx., Ta 20% approx., and Cb and Ta 60% min, C 0.30% max) ton lots, 2" x D, $4.75 per lb of contained Cb plus Ta, deld.; less ton lots $4.80.

Silicaz Alloy: (Si 35-40%, Ca 9-11%, Al 6-8%, Zr 3-5%, Ti 9-11%, B 0.55-0.75%). Carload packed 1" x D, 45c per lb of alloy, ton lot 47c, less ton 49c. Delivered.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Contract, carload, packed, ⅛" x 12 M, 17.5c per lb of alloy, ton lots 18.25c, less ton 19.5c. Deld. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 17.50c per lb of alloy; ton lots 18.50c; less ton lots 20c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 16.6 per lb of alloy; ton lots 18.10c; less ton lots 19.35c, f.o.b. Niagara Falls; freight allowed to St. Louis.

Simanal: (Approx. 20% each Si, Mn, Al; bal. Fe). Lump, carload, bulk 15.50c. Packed c.l. 16.50c, 2000 lb to c.l. 16.75c, less than 2000 lb 17.25c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $4 for each 1% of P above or below the base); carloads, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $90 per gross ton.

Ferromolybdenum: (55-75%). Per lb contained Mo, f.o.b. Langeloth. $1.32 in all sizes except powdered which is $1.41; Washington, Pa., furnace, any quantity $1.32.

Technical Molybdic-Oxide: Per lb contained Mo, f.o.b. Langeloth, Pa., $1.14 in cans; in bags, $1.13, f.o.b. Langeloth, Pa.; Washington, Pa., $1.13.

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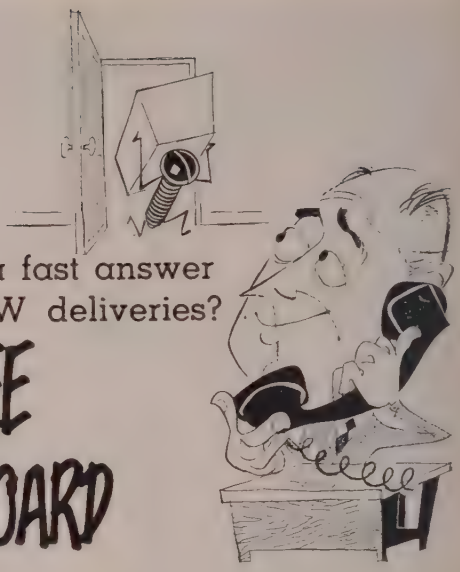

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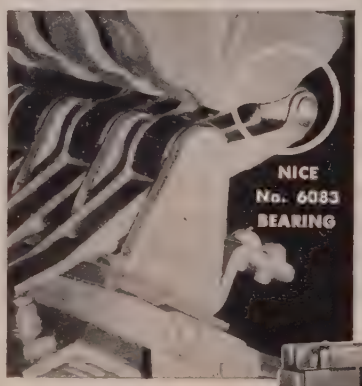

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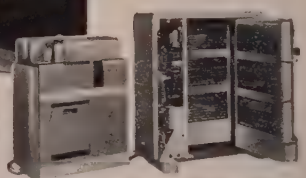

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Tubular Goods . . .

Tubular Goods Prices, Page 157

Pittsburgh — Although pipe sales are strengthening, use of standard pipe doesn't reflect the high rate of activity in construction. Volume is expected to increase further in the third quarter.

Shipments of seamless tubes will be strong to the oil industry through September. Such consumers as electric power plants, utilities and boiler manufacturers are reported to have large tube-purchasing programs for the remainder of the year.

Washington — American Pipeline Corp. will start work at once on construction of a $170 million steel pipeline from Beaumont, Tex., to Newark, N. J., requiring 437,000 tons. This follows approval of the project by the Office of Defense Mobilization. The pipe will be 26-inches diameter from Beaumont to Louisville, Ky., and 24-inches from Louisville to Newark.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 154

Boston—Although reinforcing bar demand is holding substantially high, prices are easy. By shopping, contractors can get formed bars $10 to $15 per ton under first estimates. Bridge and building inquiry holds up, but there is a decline in municipal housing work. Bulk of 3000 tons for the Maine turnpike extension has been placed with a South Portland, Me., shop.

Structural Shapes . . .

Structural Shape Prices, Page 154

Chicago—Inland Steel Co. will install facilities to produce wide-flange structural steel beams at its Indiana Harbor Works. Only two other companies in the country produce a full size range of this type of beam and only one mill for their production is located in the Chicago area.

The Inland project contemplates revamping an existing mill, the 28-inch mill in plant 2 at Indiana Harbor, on which standard structurals and rails are now rolled. It will be converted so as to roll wide-flange beams in addition to its present products. The mill will have capacity to produce up to 325,000 tons of 8-inch to 24-inch wide-flange beams annually.

Boston—For some months steel and metal quotations on construction contracts have been under engineers' estimates. An exception is the 7880-ton superstructure, Sakonnet river bridge, Portsmouth-Tiverton, R. I., Harris Structural Steel Co., Inc., New York, low. This project, combination plate

ORES–COKE–REFRACTORIES

Prices as reported to STEEL; changes shown in *italics*.

ORES

Lake Superior Iron Ore

(Prices effective July 1, 1953, and thereafter; gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Old range bessemer	$10.30
Old range nonbessemer	10.15
Mesabi bessemer	10.05
Mesabi nonbessemer	9.90
Open-hearth lump	11.15
High phosphorus	9.90

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon which were in effect on June 24, 1953, and increases or decreases after such date are for buyer's account.

Eastern Local Iron Ore

Cents per unit deld. E. Pa.

Foundry and basic 56-62% concentrates contract	17.00-18.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60 to 68%	20.00
North African hematite (spot)	20.00-22.00
Brazilian iron ore, 68-69% (spot)	25.00

Tungsten Ore

Net ton unit, before duty

Foreign Wolframite, good commercial quality	$23.00
Domestic scheelite, mine	63.00

Manganese Ore

Mn 48%, nearby, $1.02-$1.05 per long ton unit c.i.f. U. S. ports, duty for buyer's account; 46-47%, $0.95-$0.97.

Chrome Ore

Gross ton, f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., or Tacoma, Wash.

Indian and African

48% 2.8:1	$40.00-$42.00
48% 3:1	44.00-46.00
48% no ratio	32.00-34.00

South African Transvaal

44% no ratio	$21.00-$22.00
48% no ratio	34.00

Domestic

(Rail nearest seller)

48% 3:1	$39.00

Molybdenum

Sulphide concentrate, per lb, Mo content mines, unpacked	$1.00

Antimony Ore

Per unit of Sb content, c.i.f. seaboard

50-60%	$2.40-$2.80
65% min.	$3.40-$3.50

Vanadium Ore

Cents per lb. V_2O_5 content, deld. mills

Domestic	31.00

REFRACTORIES

Fire Clay Brick

High-Heat Duty: Pueblo, Colo., $89; Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., Woodbridge, N. J., $109; Salina, Pa., $114; Niles, O., $120; Los Angeles, Pittsburg, Calif., $132.30.

Silica Brick

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Portsmouth, O., $115; Warren, O., Hays, Pa., $120; Niles, O., $120; E. Chicago, Ind., Joliet, Rockdale, Ill., $125; Cutler, Utah, $116.55; Los Angeles, $122.85.

Insulating Fire Brick

2300° *F:* Massillon, O., $178.50; Clearfield, Pa., $213; Augusta, Ga., Beaver Falls, Zelienople, Pa., Mexico, Mo., $206; Vandalia, Mo., $214.10; Portsmouth, O., $207.50; Bessemer, Ala., $212.80.

Ladle Brick

Dry Pressed: Bessemer, Ala., $64.60; Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Pa., Wellsville, O., $77.50; Mexico, Mo., $73.50; Clearfield, Pa., Portsmouth, O., $83; Perla, Ark., $109; Los Angeles, $110.25; Pittsburg, Calif., $111.30.

Sleeves

Reesdale, Pa., $139.70; Johnstown, Pa., $140; Clearfield, Pa., $148.50; St. Louis, $151.80; Athens, Tex., $155.

Nozzles

Reesdale, Pa., $223.50; Johnstown, Pa., $229.20; Clearfield, Pa., $241.40; St. Louis, $247.10; Athens, Tex., $247.70.

Runners

Reesdale, Pa., $174; Johnstown, Pa., $177.80; Clearfield, Pa., $185.50; St. Louis, $187.30; Athens, Tex., $191.80.

High-Alumina Brick

50 *Per Cent:* Clearfield, Pa., St. Louis, Mexico, Mo., $179; Danville, Ill., $169.30.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $223.00; Danville, Ill., $213.20.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $225; Danville, Ill, $258; Clearfield, Pa., $252.

Dolomite

Domestic, dead-burned bulk; Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Narlo, Gibsonburg, Woodville, O., $14.50; Thornton, McCook, Ill., $14.60; Dolly Siding, Bonne Terre, Mo., $13.65.

Magnesite

Domestic, deadburned bulk; Luning, Nev., $38.

METALLURGICAL COKE

Price per net ton

Beehive Ovens

Connellsville, furnace	$14.50-$15.00
Connellsville, foundry	16.50-17.00

Oven Foundry Coke

Kearney, N. J., ovens	$24.00
Everett, Mass., ovens	
New England, deld.	*26.05
Chicago, ovens	24.50
Chicago, deld.	26.00
Terre Haute, ovens	24.05
Milwaukee, ovens	25.25
Indianapolis, ovens	24.25
Chicago, deld.	28.12
Cincinnati, deld.	25.85
Painesville, O., ovens	25.50
Cleveland, deld.	27.43
Erie, Pa., ovens	25.00
Birmingham, ovens	22.65
Cincinnati, deld.	27.58
Buffalo, ovens	25.00
Buffalo, deld.	26.25
Lone Star Tex., ovens	18.50
Philadelphia, ovens	23.00
Swedeland, Pa., ovens	23.00
St. Louis, ovens	
St. Louis deld.	26.00
St. Paul, ovens	23.75
Portsmouth, O., ovens	24.00
Cincinnati, deld.	26.62
Detroit, ovens	25.50
Detroit, deld.	26.50
Pontiac, deld.	27.06
Saginaw, deld.	28.58

*Or within $4.55 freight zone from works.

COAL CHEMICALS

Spot, cents per gallon, ovens

Pure benzol	40.00
Toluol, one deg	32.00-35.00
Industrial xylol	32.00-35.00

Per ton, bulk, ovens

Sulphate of ammonia	$42-$45
Birmingham area	42.00†

†With port equalization against imports.

Cents per pound, producing point

Phenol 40 deg. (U.S.P.), tank cars	18.00
c.l. drums	19.00
l.c.l. drums	19.50

FLUORSPAR

Metallurgical grades, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $44; 70%, $42.50; 60%, $38. Imported, net ton, duty paid, metallurgical grade, $35-$36.

ELECTRODES

(Threaded with nipple, unboxed f.o.b. plant)

GRAPHITE

Inches Diam.	Length	Per 100 lb
2	24	$43.50
2½	30	28.00
3	40	27.25
4	40	26.00
5½	40	25.75
6	60	23.25
7, 8, 9, 10	60	21.00
12, 14	72	20.50
16	72	20.00
17	60	20.50
18	72	20.50
20	72	20.00

CARBON

40	100	$8.95
40, 35, 30	110	8.95
30	84	9.10
24	96	8.90
24	72, 84	9.10
20	90	8.95
Z0	84	9.10
17	72	9.10
17	60	9.50
14	72	9.50
14, 12, 10	60	10.30
8	60	10.55

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Industrial - Ornamental
Any Perforation - Any Coil, Sheet or Plate Material

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Wood Products — hard boards and plywood.
Plastics—and plastic coated fabrics in sheets or rolls. Materials can be perforated in sheets, plates or coils.

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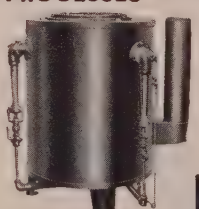
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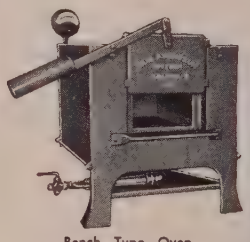
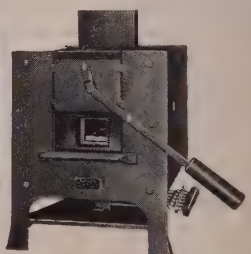

Bench Type Oven Furnace 2000° F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girder, beam spans and stringers, includes some silicon steel and other special specifications. Early delivery of fabricated steel is wanted. Plans call for completion, Sept. 1, 1955.

Philadelphia—Fabricated structural steel prices are firming slightly. There is still sharp competition among fabricators, but less than there was. Bridge work continues outstanding.

Pittsburgh—Inquiries for construction projects are gaining in volume, especially in highway and bridge construction.

Los Angeles—Bethlehem Pacific Coast Steel Corp. plans a new structural fabricating plant in this area to be built at an estimated cost of $4 million to $5 million. Work on the plant is scheduled to start this summer. The facility should be in operation in about a year. It will be built on a 46-acre tract in Torrance, and will replace the present district fabricating plant of the company.

Wire . . .

Wire Prices, Page 156

Philadelphia—Domestic nails are moving well despite imports. This reflects the high rate of building activity. Merchant wire business is so-so, although continuing at a higher level than trading in manufacturers wire. Roebling's operations in the Trenton area have been suspended for two weeks, or until July 6, for mass vacations.

Boston—Wire mills are operating at lower levels with the prospect of lighter shipments in July. Leading consumers of wire entering industrial products are sensitive to their own order books. Most have worked down inventory.

Canada . . .

Toronto, Ont.—Production of primary iron and steel shapes in Canada during March amounted to 324,363 net tons of which 316,337 tons were carbon and 8026 tons alloy. February production was 306,705 tons including 296,851 carbon and 9854 alloy, while March, 1953, output was 417,266 tons including 398,704 tons of carbon and 18,562 tons of alloy.

Deliveries under producers' interchange for further processing in primary plants included in the above totals were 101,338 tons for March, 94,755 for February, and 115,808 for March, 1953.

Shipments for sale in March were 229,400 net tons. This compares with 214,115 in February and 312,899 in March last year.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

2400 tons, Pennsylvania railroad viaduct, Pittsburgh, to American Bridge Division, U. S. Steel Corp., Pittsburgh.

1000 tons, West Side airline terminal, New York, through Bethlehem Engineering Co., general contractor, to Grand Iron Works, Bronx, that city.

720 tons, 16-story office building, 68th St. and Madison Ave., New York, through Fred Rose, general contractor, to Terry Steel Contractors, that city.

700 tons, two Army warehouses, Elmendorf Air Base, Alaska, to Bethlehem Pacific Coast Steel Corp., Seattle; L. E. Baldwin Inc., Seattle, general contractor, $2,403,338.

600 tons, steam plant, naval amphibious base, Little Creek, Va., to B. L. Montague & Co., Sumter, S. C.; Lang Construction Co., Hampton, Va., general contractor.

500 tons, or more, main manufacturing building, bag plant, St. Regis Paper Co., Franklin, Va., to Bristol Steel & Iron Co., Bristol, Va.; Tidewater Construction Co., Norfolk, Va., general contractor erecting steel; Globe Iron Construction Co., Norfolk, furnishing prefabricated buildings, warehouse sections.

430 tons, Gore Air Field hangar, Great Falls, Mont., to unstated interests; Hagstrom Construction Co., St. Paul, Minn., general contractor.

220 tons, deep sea terminal, Whittier, Alaska, to Isaacson Iron Works, Seattle; Patti-MacDonald Co., San Francisco, general contractor.

141 tons, also 37 tons reinforcing, to Bethlehem Pacific Coast Steel Corp., Seattle, highway bridge for Alaska Road Commission to Isaacson Iron Works, Seattle; David Nygren, Seattle, general contractor.

113 tons, Sand Point bridge, Idaho, to unstated interest; Peter Kiewit & Sons Co., Longview, Wash., general contractor.

STRUCTURAL STEEL PENDING

7880 tons, plate girder, stringer and truss beam bridge, superstructure, Sakonnet river, Portsmouth-Tiverton, R. I., Harris Structural Steel Co., Inc., New York, low, $3,816,777; American Bridge Division, U. S. Steel Corp., $3,875,873.45; Bethlehem Steel Co., $3,894,888.95; bids June 16, Providence.

5940 tons, state bridge, Luzerne county, Pa., bids July 9; also required are 1538 tons of reinforcing steel.

3430 tons, air base, Dover, Del., with J. W. Batson, Dallas, Tex., low on general contract for hangars, involving 3300 tons and Dean Construction Co., Long Island City, N. Y., low on engine shop involving 130 tons.

2570 tons, state bridge, Vine street, Philadelphia, bids July 9.

1750 tons, state highway bridges, Ohio turnpike, Lorain county; bids July 7, Ohio Turnpike Commission, Columbus, O.; contract also includes erecting of 750 tons, Black river bridge, to be furnished by commission.

800 tons, estimated, ventilation building in connection with expansion of Lincoln tunnel under the Hudson river, New York, general contract awarded through the Port of New York Authority, to the Colmar Construction Co., Brooklyn. Building will be erected on the Manhattan side. General contract for an administration building, requiring a limited amount of steel, and to be erected on the New Jersey side in Weehawken, has been awarded to James Mitchell Inc., Jersey City, N. J.

108 tons, state bridge, Lancaster county, Pa., bids July 9.

REINFORCING BARS . . .

REINFORCING BARS PLACED

300 tons, Montana state laboratory, Helena, Mont., to Soule Steel Co., Seattle.

180 tons, East Flatbush telephone building, Brooklyn, through Cuzzi Bro. & Singer, general contractors, to the Jones & Laughlin Steel Corp., Long Island City, N. Y.

160 tons, steam plant, naval amphibious base, Little Creek, Va., to Hall-Hodges Co., Norfolk, Va.; Lang Construction Co., Hampton, Va., general contractor.

150 tons, bag manufacturing building, St. Regis Paper Co., Franklin, Va. to Hall-Hodges Co., Norfolk, Va.; Tidewater Construction Corp., Norfolk, general contractor.

150 tons, North Seattle launching site and work at Ft. Lewis, Wash., to Soule Steel Co., Seattle.

100 tons, Wenatchee, Wash., detention home, and miscellaneous, to Northwest Steel Rolling Mills Inc., Seattle.

100 tons, Alaska road and bridge and miscellaneous, to Bethlehem Pacific Coast Steel Corp., Seattle.

REINFORCING BARS PENDING

1538 tons, state bridge work, Luzerne county, Pa., bids July 9; also required are 5940 tons of structural shapes.

1250 tons, state highway bridges, Ohio turnpike, Lorain county; bids July 7, Ohio Turnpike Commission, Columbus, O., also 128,000 square yards, 10-inch reinforced concrete pavement.

1020 tons, Albert Einstein College of Medicine of Yeshiva University, Bronx, New York, general contract placed with Cauldwell-Wingate Co., that city. It is estimated less than 100 tons of structural steel will be required.

200 tons, Washington state road projects; bids to Olympia, Wash., July 7.

125 tons (also 25 tons of shapes) Wanship dam, Weber Basin project, Utah; Utah Construction Co., Salt Lake City, low $2,423,046, to Bureau of Reclamation.

PLATES . . .

PLATES PLACED

1040 tons, sheet steel piling, Whittier, Alaska, deep sea terminal, to Bethlehem Pacific Coast Steel Corp., Seattle; Patti-MacDonald Co., San Francisco, general contractor.

146 tons, sheet steel piling, Susitna bridge, Alaska, to Bethlehem Pacific Coast Steel Corp., Seattle.

100 tons, water reservoir, Salem Heights Water District, Oregon, to Chicago Bridge & Iron Co., Seattle, low $32,695.

PLATES PENDING

500 tons, three large, five small fuel oil tanks, Mountain Home, Idaho, air base; Thorne & Marble, Seattle, low $969,011.

270 tons, 24 vegetable oil tanks, plans prepared, bids early July to Port of Seattle.

PIPE . . .

CAST IRON PIPE PLACED

120 tons, Port Angeles, Wash., and Boeing Airplane Co., Seattle, to Pacific States Cast Iron Pipe Co., Seattle.

CAST IRON PIPE PENDING

560 tons, 16 to 4-inch; bids to Tacoma, Wash., June 21.

400 tons, various sizes for inventory; bids opened by Portland, Oreg., June 18.

204 tons, Umatilla, Oreg., system extension; bids in June 21.

STEEL PIPE PENDING

437,000 tons, 24 and 26-inch steel pipe for 1910-mile line from Beaumont, Tex., to Newark, N. J., American Pipeline Corp., approval granted by Office of Defense Mobilization. Work will begin shortly, with schedules calling for completion within 12 months. Estimated line will cost $170 million and will be capable of delivering 500,000 barrels of petroleum products daily to the Newark terminus.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Babcock & Wilcox Co., for its Barberton, O., plant, one 50-ton diesel electric industrial locomotive, to Baldwin-Lima-Hamilton Corp., Philadelphia.

General American Transportation Co., Saegertown, Pa., one 35-ton diesel hydraulic industrial locomotive to Baldwin-Lima-Hamilton Corp., Philadelphia.

Northern Pacific, five 4-unit 7000-horsepower road freight locomotives, to Electromotive Division, General Motors Corp., La Grange, Ill.

Pittsburgh Plate Glass Co., Pittsburgh, one 80-ton diesel electric industrial locomotive for its Ford City, Pa., plant, to Baldwin-Lima-Hamilton Corp., Philadelphia.

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AIR AND HYDRAULIC
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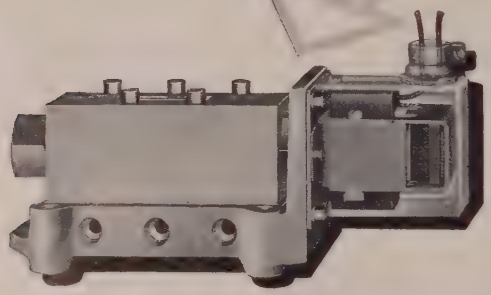
FEATURE THIS MONTH



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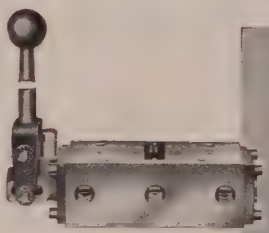

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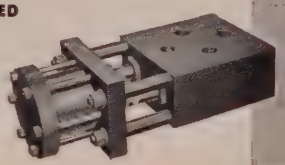

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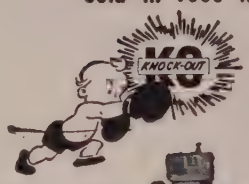
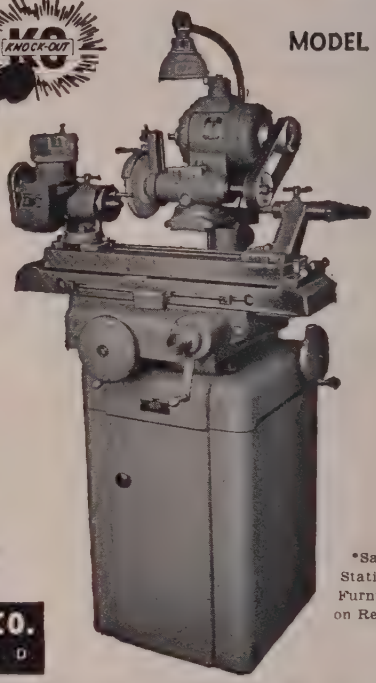


MODEL B860



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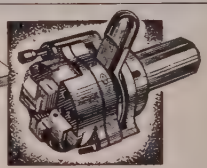

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Scrap Prices Weaken at Some Points

Open-hearth grades slip $1 per ton as threat of a steel strike July 1 becomes more ominous. Further drop seen if developments this week show walkout is certain

Scrap Prices, Page 174

Detroit — Scrap prices dropped somewhat this week with market observers expecting further declines over the next few weeks. Some mills reportedly are conceling previous orders and slackening demand from outside areas contribue to the feeling of softness in the market. Drops of about $5 in open-hearth grades are anticipated by traders in the period immediately ahead.

Youngstown—Scrap continues in the doldrums here with trading held to a few cars taken by the big steel producers. The mills seem to be well supplied with metallics. Republic Steel Corp. is virtually out of the market.

Cleveland—Refusal of the steelworkers' union to accept the wage offer of the U. S. Steel Corp. has served to further weaken the scrap market here with threat of a steel strike July 1 taking on more meaning.

Generally, the market on open-hearth grades is quoted about $1 per ton lower, but the blast furnace grades, for the moment, appear to be holding. The mills are understood to have ordered little tonnage for July shipment.

Cast grades also are down about $1 per ton, reflecting sluggish demand attending impending vacation suspensions.

Chicago—Extremely light buying of scrap is holding the market status quo. Prices for steelmaking material are stationary at last week's level which was down $1 a ton from previous activity. It is general opinion that mill operations are facing a summer dip but the ingot rate here remains steady so far. Demand for cast scrap is off with many foundries preparing to close for vacations in early July.

Philadelphia — Trading in scrap continues dull, price on No. 2 bundles declining to a range of $18 to $19 delivered, machine shop turnings to $15 and low phos structurals and plate to $26. Malleable scrap also declined to a nominal price of $37 delivered.

The trade anticipates little domestic activity over the next several weeks. Meanwhile, a cargo of No. 1 and No. 2 heavy melting steel is being bought for shipment from this port early in July at prices higher than quoted in the domestic market.

New York — Scrap brokers have boosted buying prices on machine shop turnings to a spread of $5 to $6. Quotations on all other grades are unchanged, reflecting general dullness.

Pittsburgh—Small volume activity occurred on price levels established earlier. Dealers are inclined to resist declines in price of No. 1 heavy melting scrap, although mill activity is expected to decline during July and August vacation periods. In cast iron grades price of No. 1 cupola dropped $1 to a $36 to $37.

Buffalo—The scrap market continues to show strength here with price advances of $1 per ton reported on No. 2 heavy melting and No. 2 bundles. While tonnage on new orders placed by a leading mill was only moderate dealers' sentiment was bolstered. Boat receipts got under way with approximately 3600 tons arriving from the eastern seaboard by barge.

Cincinnati—The scrap market here is quiet. Prices are unchanged. New buying will begin this week following close of bidding on industrial lists.

Birmingham—Demand for cast scrap is reported fairly active but blast furnace and open hearth grades continue to move slowly. Steel production in this district is estimated currently at 76 per cent of rated capacity.

Los Angeles—Increased purchases

(*Please turn to page* 176)

A-1043

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New York • Philadelphia • Pittsburgh

IRON AND STEEL SCRAP

Consumer prices, per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL. Changes shown in italics.

STEELMAKING SCRAP COMPOSITE

June 23	$27.83
June 16	27.83
May Avg.	28.00
June, 1953	40.50
June, 1949	20.85

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

(Delivered consumer plant)

No. 1 heavy melting	29.00-30.00
No. 2 heavy melting	26.00-27.00
No. 1 bundles	29.00-30.00
No. 2 bundles	24.00-25.00
No. 1 busheling	29.00-30.00
Machine shop turnings	15.00-16.00
Mixed borings, turnings	15.00-16.00
Short shovel turnings	19.00-20.00
Cast iron borings	19.00-20.00
Cut structurals	30.00-31.00
Heavy turnings	28.00-29.00
Punchings & plate scrap	32.00-33.00
Electric furnace bundles	31.00-32.00

Cast Iron Grades

No. 1 cupola	*36.00-37.00*
Charging box cast	33.00-34.00
Heavy breakable cast	31.00-32.00
Unstripped motor blocks	24.00-25.00
No. 1 machinery cast	43.00-44.00

Railroad Scrap

No. 1 R.R. heavy melt.	*31.00-32.00*
Rails, 2-ft and under	43.00-44.00
Rails, 18-in. and under	45.00-46.00
Rails, random lengths	37.00-38.00
Railroad specialties	34.00-35.00

Stainless Steel Scrap

(F.o.b. shipping point)

18-8 bundles & solids	165.00-170.00
18-8 turnings	85.00-90.00
430 bundles & solids	65.00-70.00
430 turnings	50.00-52.00

CLEVELAND

(Delivered consumer plant)

No. 1 heavy melting	*27.00-28.00*
No. 2 heavy melting	*23.00-24.00*
No. 1 bundles	*27.00-28.00*
No. 2 bundles	*20.00-21.00*
No. 1 busheling	*27.00-28.00*
Machine shop turnings	12.00-13.00
Mixed borings, turnings	16.00-17.00
Short shovel turnings	16.00-17.00
Cast iron borings	16.00-17.00
Low phos.	26.00-27.00
Cut structural plate 2 ft. and under	*33.00-34.00*
Alloy free, short shovel turnings	16.50-17.50
Electric furnace bundles	*25.00-26.00*

Cast Iron Grades

No. 1 cupola	*40.00-41.00*
Charging box cast	*26.50-27.50*
Stove plate	*35.50-36.50*
Heavy breakable cast	*25.50-26.50*
Unstripped motor blocks	*25.50-26.50*
Brake shoes	*29.50-30.50*
Clean auto cast	*42.00-43.00*
No. 1 wheels	*32.50-33.50*
Burnt cast	*30.50-31.50*
Drop broken machinery	*42.00-43.00*

Railroad Scrap

No. 1 R.R. heavy melt.	31.00-32.00
R.R. malleable	41.00-42.00
Rails, 3-ft. and under	44.00-45.00
Rails, 18 in. and under	47.00-48.00
Rails, random lengths	40.00-41.00
Cast steel	34.00-35.00
Railroad specialties	35.00-36.00
Uncut tires	36.00-37.00
Angles, splice bars	42.50-43.50
Rails, rerolling	42.00-43.00

Stainless Steel

(F.o.b. shipping point)

18-8 bundles, solids	nom. 160.00-170.00
18-8 turnings	nom. 70.00-80.00
430 clips, bundles, solids	nom. 70.00
430 turnings	40.00-50.00

YOUNGSTOWN

(Delivered consumer plant)

No. 1 heavy melting	*28.00-29.00*
No. 2 heavy melting	*23.00-24.00*
No. 1 bundles	*28.00-29.00*
No. 2 bundles	*21.00-22.00*
Machine shop turnings	13.00-14.00
Short shovel turnings	19.00-20.00
Cast iron borings	19.00-20.00
Low phos.	30.00-31.00
Electric furnace bundles	*28.00-29.00*

Railroad Scrap

No. 1 R.R. heavy melt.	31.00-32.00

PHILADELPHIA

(Delivered consumer plant)

No. 1 heavy melting	23.00
No. 2 heavy melting	21.00
No. 1 bundles	24.00
No. 2 bundles	*18.00-19.00*
No. 1 busheling	23.00
Electric furnace bundles	25.00*
Machine shop turnings	*15.00*
Mixed borings, turnings	15.00
Short shovel turnings	17.00
Structurals & plate	*26.00*
Heavy turnings	22.00*
Couplers, springs, wheels	31.00
Rail crops, 2 ft & under	41.00

Cast Iron Grades

No. 1 cupola	35.00
Malleable	*37.00*
Heavy breakable cast	35.50
Unstripped motor blocks	nom.
Drop broken machinery	41.00

*Nominal.

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	17.00-18.00
No. 2 heavy melting	*15.00-15.25*
No. 1 bundles	17.00-18.00
No. 2 bundles	*12.25-13.25*
Machine shop turnings	*5.00-6.00*
Mixed borings, short turnings	8.00-9.00
Low phos. (structural & plate)	21.00-22.00
Short shovel turnings	*7.50-8.00*

Cast Iron Grades

No. 1 cupola	29.00-30.00
Unstripped motor blocks	19.00-20.00*

Stainless Steel

18-8 sheets, clips, solids	170.00-175.00
18-8 borings, turnings	70.00-75.00
430 sheets, clips, solids	40.00
410 sheets, clips, solids	30.00

*Nominal.

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	17.00
No. 2 heavy melting	15.25-16.00
No. 1 bundles	17.00
No. 2 bundles	13.25-14.25
Machine shop turnings	3.00-3.50
Mixed borings, turnings	5.50-6.00
Short shovel turnings	10.00-10.50
No. 1 cast	29.00-30.00
Mixed cupola cast	27.00-28.00
No. 1 machinery cast	32.00-33.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	27.00-28.00
No. 2 heavy melting	24.00-25.00
No. 1 bundles	27.00-28.00
No. 2 bundles	22.00-23.00
No. 1 busheling	27.00-28.00
Machine shop turnings	11.00-12.00
Mixed borings, turnings	14.00-15.00
Short shovel turnings	14.00-15.00
Cast iron borings	14.00-15.00
Low phos., 18-in.	32.00-33.00

Cast Iron Grades

No. 1 cupola	38.00
Heavy breakable cast	36.00
Charging box cast	36.00
Drop broken machinery	45.00

Railroad Scrap

No. 1 R.R., heavy melt.	29.00-30.00
Rails, 18-in. and under	44.00-45.00
Rails, random lengths	37.00-38.00

CHICAGO

No. 1 heavy melting	30.00-32.00
No. 2 heavy melting	27.00-28.00
No. 1 factory bundles	32.00-33.00
No. 1 dealer bundles	30.00-31.00
No. 2 bundles	22.00-23.00
No. 1 busheling	30.00-32.00
Machine shop turnings	13.00-14.00
Mixed borings, turnings	13.00-14.00
Short shovel turnings	15.00-16.00
Cast iron borings	15.00-16.00
Cut structurals, 3-ft.	34.00-35.00
Punchings & plate scrap	34.00-35.00
Electric furnace bundles	33.00-34.00

Cast Iron Grades

No. 1 cupola	38.00-39.00
Stove plate	32.00-34.00
Unstripped motor blocks	24.00-25.00
Clean auto cast	40.00-42.00
Drop broken machinery	41.00-42.00

Railroad Scrap

No. 1 R.R. heavy melt	33.00-34.00
R.R. malleable	40.00-42.00
Rails, 2-ft. and under	44.00-45.00
Rails, 18-in. and under	45.00-46.00
Angles, splice bars	38.00-39.00
Rails, rerolling	44.00-45.00

Stainless Steel Scrap

18-8 clips & solids	130.00-140.00
18-8 turnings	60.00
430 clips & solids	40.00
430 turnings	20.00-22.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*21.00*
No. 2 heavy melting	*18.00*
No. 1 bundles	*23.00*
No. 2 bundles	*17.00*
No. 1 busheling	*21.50*
Machine shop turnings	*9.00*
Mixed borings, turnings	10.00
Short shovel turnings	*10.50*
Punchings & plate scrap	25.50

Cast Iron Grades

No. 1 cupola	*33.00*
Charging box cast	27.00
Stove plate	29.00
Heavy breakable	*24.00*
Unstripped motor blocks	18.00
Clean auto cast	*37.00*
Malleable	28.00

BUFFALO

No. 1 heavy melting	26.00-27.00
No. 2 heavy melting	*22.50-23.50*
No. 1 bundles	26.00-27.00
No. 2 bundles	*20.50-21.50*
No. 1 busheling	26.00-27.00
Machine shop turnings	14.00-15.00
Mixed borings, turnings	17.50-18.00
Short shovel turnings	18.50-19.00
Cast iron borings	17.50-18.00
Low phos.	29.00-29.50

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	37.00-38.00
No. 1 machinery	41.00-42.00

Railroad Scrap

Rails, random lengths	33.00-34.00
Rails, 3-ft and under	40.00-41.00
Railroad specialties	34.50-35.50

BIRMINGHAM

No. 1 heavy melting	23.50-24.50
No. 2 heavy melting	22.00-23.00
No. 1 bundles	18.00-19.00
No. 2 bundles	16.00-17.00
Cast iron borings	13.00-14.00
Short shovel turnings	16.00-17.00
Machine shop turnings	15.00-16.00
Electric furnace bundles	26.00-27.00

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	43.50-44.50
Stove plate	40.50-41.50
Bar crops and plate	29.00-30.00
Structural, plate 2 ft.	29.00-30.00
Unstripped motor blocks	35.00-36.00

Railroad Scrap

No. 1 R.R. heavy melt.	26.00-27.00
Rails, 18-in. and under	40.00-41.00
Rails, rerolling	39.00-40.00
Angles, splice bars	36.00-37.00
Stand. steel axles	35.00-36.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	26.50
No. 2 heavy melting	24.50
No. 1 bundles	26.50
No. 2 bundles	20.25
Machine shop turnings	12.00
Short shovel turnings	14.00

Cast Iron Grades

No. 1 cupola	37.00
Charging box cast	29.00
Heavy breakable cast	29.00
Unstripped motor blocks	29.00
Brake shoes	30.00
Clean auto cast	39.00
Stove plate	33.00

Railroad Scrap

No. 1 R.R. heavy melt.	33.50
Rails, 18-in. and under	41.00
Rails, random lengths	38.00
Rails, rerolling	44.00
Uncut tires	32.50
Angles, splice bars	33.50

SEATTLE

(Delivered consumer plant)

No. 1 heavy melting	23.00
No. 2 heavy melting	19.00
No. 1 bundles	21.00
No. 2 bundles	16.00
No. 3 bundles	13.00
Machine shop turnings	11.50
Mixed borings, turnings	11.50
Short shovel turnings	11.50
Electric furnace, No. 1	35.00

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	30.00-35.00
Heavy breakable cast	25.00
Unstripped motor blocks	23.00
No. 1 wheels	21.00
Stove plate(f.o.b. plant)	28.00
Brake shoes	28.00

Railroad Scrap

(Delivered consumer plant)

Rails, random lengths	30.00-34.00

SAN FRANCISCO

No. 1 heavy melting	20.00
No. 2 heavy melting	16.00
No. 1 bundles	19.00
No. 2 bundles	16.00
No. 1 busheling	20.00
Machine shop turnings	5.00
Mixed borings, turnings	5.00
Short shovel turnings	9.00
Cast iron borings	9.00
Cut structurals	25.00
Heavy turnings	9.00
Punchings & plate scrap	25.00
Electric furnace bundles	19.00

Cast Iron Grades

No. 1 cupola	41.00-43.00
Charging box cast	35.00
Stove plate	37.00
Heavy breakable cast	36.00
Unstripped motor blocks	29.00
Brake shoes	35.00
Clean auto cast	39.00
No. 1 wheels	39.00
Burnt cast	23.00
Drop broken machinery	43.00

LOS ANGELES

No. 1 heavy melting	20.00
No. 2 heavy melting	16.00
No. 1 bundles	18.00
No. 2 bundles	14.00
Machine shop turnings	5.00

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	38.00-42.00

HAMILTON, ONT.

(Delivered prices)

No. 1 heavy melting	$22.00
No. 2 heavy melting	19.00
No. 1 bundles	22.00
No. 2 bundles	17.00
Mixed steel scrap	16.00
Mixed borings, turnings	12.00
Rails, remelting	32.00
Busheling, new factory: Prepared	20.00
Unprepared	16.00
Short steel turnings	12.00

Cast Iron Grades†

No. 1 machinery cast	42.00-45.00

†F.o.b., shipping point.

Great Moments in the History of Iron and Steel Making

Early French Iron Foundry Circa 1700 ..... *This is the first in a series of outstanding inventions and developments that have contributed to the progress of the iron and steel industry.*

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In 1722 when Rene Antoine de Reamur discovered a method to reduce metal from ore and carburize it in one operation, a giant step was made in the conversion of bar iron into steel. It was the first clear demonstration of the systematic process of cementation.

Through the years experts have improved the quality of malleable castings to meet the rigid requirements of industry. Today, to insure toughness, ductility and high strength, foundrymen include pig iron, sprue and malleable or steel scrap in a charge.

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BART LECTRO-CLAD NICKEL-PLATED Steel Plate and Sheet

for fabricating into products demanding corrosion and contamination control.

Nickel plated on either or both sides by the electro deposition of pure nickel which provides a permanently bonded, ductile and pore-free cladding up to .020" thick. Produced with a new plating technique developed by BART MANUFACTURING CORPORATION and now available in sizes up to 7 feet x 20 feet.

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LECTRO-CLAD PLATE is the direct outgrowth of the successful patented BART PROCESS for nickel-lining of seamless steel pipe and fittings.

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(*Concluded from page* 173)

by foundries have strengthened the sluggish scrap market.

Seattle—Conditions are unchanged in the scrap market which continues lethargic. In view of plentiful supplies, the larger consumers are carrying reduced inventories. Prices are unchanged, No. 1 and No. 2 heavy melting being quoted at $23 and $19 respectively.

The local Navy yard will receive bids about July 1 for purchase of a quarterly accumulation of scrap, about 2700 tons being offered. April bids brought prices of $18.12 for unprepared and $25 for prepared.

Stainless Steel . . .

Stainless Steel Prices, Page 158

Pittsburgh — Spring sales gains have been nullified to large extent by a fall-off in second quarter. Sales are now sporadic, with occasional upswings followed by declines. No immediate pickup is expected.

Concentrate Jasper Iron Ore

Cleveland — Production of experimental iron ore concentrate from low grade deposits of jasper in Michigan's upper peninsula by the Humboldt Mining Co. is announced by the Cleveland-Cliffs Iron Co. The Humboldt company is jointly owned by Cleveland-Cliffs and Ford Motor Co.

Pending completion of a pelletizing plant near the jasper deposits Humboldt's product is being experimentally stabilized by mixing with standard ore before shipment to Ford's Rouge plant. Prior to heating in the blast furnaces it is mixed with flue dust and sintered into large chunks.

The Humboldt process was adapted by Cleveland-Cliffs at its research laboratory in Ishpeming. The process is unlike those used in beneficiating taconite where iron particles can be removed by magnetic separation.

The Humboldt material is nonmagnetic and must be concentrated by froth flotation involving mixing crushed iron bearing jasper rock with water and chemicals. Agitation by air under pressure causes froth to rise to the surface of the concentrating tanks. Iron ore particles adhere to the froth while waste material drops to the bottom of the tanks. The froth is skimmed off and the moisture removed. Two tons of jasper are required to produce one ton of concentrate.

Humboldt's first concentrating facility has an estimated annual capacity of 250,000 tons. This year's production will be approximately 150,000 tons of concentrate.

CLASSIFIED

WANTED—METALLOGRAPHIC MICROSCOPE, preferably with inverted stage. Also polishing equipment. Send information on either, or both, to Sorensen Industries, P. O. Box 150, Darby, Pennsylvania.

Help Wanted

QUALIFIED BLAST FURNACE SUPERINTENDENT or Assistant on single stack plant. Give experience, education and salary expected. Write in detail. Reply Box 978, STEEL, Penton Building, Cleveland 13, Ohio.

FORGE COMPANY LOCATED MIDWEST, REQUIRES PLANT SUPERINTENDENT. MUST HAVE EXPERIENCE ALL PHASES FORGING OPERATIONS INCLUDING LARGE STEAM HAMMERS. PREVIOUS SUPERVISORY EXPERIENCE AND ADMINISTRATIVE ABILITY ESSENTIAL, GIVE HISTORY, AGE, SALARY DESIRED, ETC. ADDRESS BOX 983, STEEL, PENTON BUILDING, CLEVELAND 13, OHIO.

Positions Wanted

PLANT MANAGER—M.I.T. Engineering Graduate with Proven Record in Supervision, Production, Tooling, Cost Reduction, Methods Improvement and Related Functions. Reply Box 949, STEEL, Penton Building, Cleveland 13, Ohio.

PLANT SUPERINTENDENT—A college man in his early 40's thoroughly experienced in all Phases of Structural Fabrication including Cost and Engineering, desires similar position preferably in South or Southwest. Reply Box 986, STEEL, Penton Building, Cleveland 13, Ohio.

Representatives Wanted

REPRESENTATIVE WANTED by manufacturer for HIGH GRADE Cutting & Grinding Oil. Choice Territories Open. Reply Box 985, STEEL, Penton Building, Cleveland 13, Ohio.

For Sale

FOR SALE—One Landis 12" x 72" Type C Universal Grinding Machine, heavy bed, complete with all necessary accessories, good as new and in perfect condition. Reply Box 990, STEEL, Penton Building, Cleveland 13, Ohio.

FOR SALE

5 Ton Niles-Bement-Pond cab operated Overhead Traveling Crane complete with 65' bridge and 185' long steel runway structure.

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Blocks—Plates—Rounds
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WANTED

Salesman to sell Stainless Steel. Chicago area. Must have experience and following. Good salary, an excellent opportunity. Give full qualifications and experience in first letter.

STANDARD STEEL & WIRE CORPORATION
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ROLLING MILL ENGINEER

California Steel Mill has excellent opportunity for experienced rolling mill engineer. Position requires experience in design and operation of equipment for flat, tubular, shape, tin mill products. Please forward resume to BOX 988, STEEL, Penton Building, Cleveland 13, Ohio, giving complete personal history including age, education, experience and salary required. Replies confidential. Our staff knows of this advertisement.

STEEL PLANT DESIGNERS

If you have basic steel experience we have outstanding opportunities for you. Modern plant in So. Calif. which produces a wide variety of rolling mill products has openings for men with design experience in mechanical, structural and electrical fields. Please forward complete resume to BOX 989, STEEL, Penton Building, Cleveland 13, Ohio, giving personal history, age, education and salary required. Replies confidential. Our staff knows of this advertisement.

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FORGINGS—Houston Manufacturers Agent with outstanding connections oil field equipment manufacturers Texas and Oklahoma wants to represent top quality aggressive forge plant.

Reply Box 980, STEEL
Penton Building Cleveland 13, Ohio

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MANUFACTURERS REPRESENTATIVES WANTED TO REPRESENT NATIONALLY KNOWN MANUFACTURER OF METAL FINISHING EQUIPMENT INCLUDING BONDERIZING EQUIPMENT, ELECTROSTATIC PAINT SPRAY EQUIPMENT, BAKE OVENS, ETC. EXCLUSIVE TERRITORIES AVAILABLE.

REPLY BOX 981, STEEL
PENTON BUILDING CLEVELAND 13, OHIO

WANTED

#10RFRG Medart, or equivalent, Bar Turning Machine

#6 Medart 2 Roll Rotary Straightener

Both machines capable of handling round heat treated alloy steel bars from 3" to 10" in diameter inclusive, and from 30' to 40' in length.

Reply Box 984, STEEL
Penton Building Cleveland 13, Ohio

SUPERINTENDENT

by Pacific Northwest Plate Fabricating Plant

This firm has a Dun and Bradstreet AA-AI rating, has been in business over 50 years, and occupies a well equipped and thoroughly modern plant, specializing in custom fabricating, and employs from 150 to 300 men.

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Our organization has full knowledge of this ad; all communications from applicants will be treated in the strictest of confidence. In answering please give all detail possible, including age, education, experience, and all other items that may be helpful, and references if possible. Also some information as to remuneration receiving or expected.

In reply, address Box No. 987, STEEL
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1—60" McKay Machine Co. Power Driven Processing Coil Box. All Controls attached.

1—54" McKay Machine Co. 40 HP Power Rewind Reel 54" face x 20" I.D. w/20,000# Hydraulic 4 way coil buggy and all controls

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• Here's how a prominent steel company recently eliminated a real "time-waster" in its operations. Finished flat stock was not lifted out of the way fast enough . . . resulting in excessive downtime on a large milling machine.

A READING engineer was called in to analyze the situation. Following his recommendation, a CUSTOM BUILT hoist and crane, with an extra-long lift and *push button control of all motions,* was engineered and installed by READING. Now, finished stock is handled faster . . . production is smoother . . . and *only one man* is required to do the job. Maintenance time and dollars are cut because any unit can be removed for overhaul or repair without dismantling other units.

The engineering of special handling systems to fit *any* job is standard practice with READING. For full details on how you can save money with a "tailor made" READING CRANE, just drop us a line today.

Reading Crane & Hoist Corporation, 2102 Adams Street, Reading, Pa.

READING CRANES

CHAIN HOISTS · OVERHEAD TRAVELING CRANES · ELECTRIC HOISTS

Advertising Index

Abrasive Products, Inc. 146
Allegheny Ludlum Steel Corporation 28
Allied Research Products, Inc. 124
Allis-Chalmers 11
Alter Co., Alloy Metal Division 167
Aluminum Company of America 17, 18, 19, 20
American Air Filter Co., Inc. 93
American Chain & Cable, Wire Rope Sling Department 138
American Chemical Paint Co. 36
American Roller Die Corporation 141
Armco Steel Corporation 49
Associated Spring Corporation 32
Atkins Saw Division, Borg-Warner Corporation 127
Avondale Marine Ways, Inc. 33

Babcock & Wilcox Co., The, Tubular Products Division ..... Inside Front Cover
Baldwin-Lima-Hamilton, Standard Steel Works Division 87
Barnes-Gibson-Raymond, Division of Associated Spring Corporation 32
Barnes, Wallace Co., Division of Associated Spring Corporation 32
Barnes, Wallace Co., The, Ltd., Division of Associated Spring Corporation 32
Barry Corporation, The 142
Bart Manufacturing Corporation 176
Becker Bros. Carbon Co. 177
Beryllium Corporation, The 162
Bethlehem Steel Co. 1
B-G-R Cook Plant, Division of Associated Spring Corporation 32
Bigelow-Liptak Corporation 44
Bliss, E. W., Co. 8, 9
Borg-Warner Corporation, Atkins Saw Division 127
Bridgeport Brass Co. 90, 91
Bristol Brass Corporation, The 53
Browning, Victor R., & Co., Inc. 172
Buffalo Forge Co. 95

Carborundum Co., The 140
Central Steel & Wire Co. 43
Chase Brass & Copper Co. 126
Cincinnati Bickford Tool Co., The 14
Cincinnati Shaper Co., The 25
Cleveland Cap Screw Co., The 64
Cleveland Steel Tool Co., The 170
Colorado Fuel & Iron Corporation, The, Wickwire Spencer Steel Division 81
Cooper-Bessemer Corporation, The 23
Crucible Steel Company of America 143

Detroit Stamping Co. 131
Diamond Mfg. Co. 172
Dravo Corporation 180
Dravo Corporation, Heating Department 168
Dulien Steel Products, Inc. 177
Dunbar Brothers Co., Division of Associated Spring Corporation 32

Eastern Machine Screw Corporation, The 172
Easton Car & Construction Co. 173
Electric Controller & Mfg. Co., The 50
Emhart Mfg. Co., Henry & Wright Division 145
Ex-Cell-O Corporation 4, 5

Farval Corporation, The ..... Inside Back Cover
Fischer Special Mfg. Co. 163

General American Transportation Corporation 85
Gibson, William D., Co., The, Division of Associated Spring Corporation 32

Gisholt Machine Co. 21
Green, A. P., Fire Brick Co. 139
Grip Nut Co. 164
Gussett Boiler & Welding, Inc. 27

Harrington & King Perforating Co., The 170
Henry & Wright Division of Emhart Mfg. Co. 145
Heyl & Patterson, Inc. 7
Hinde & Dauch 10
Hobart Brothers Co. 3
Holliday, W. J., & Co., Inc. 45
Homestead Valve Manufacturing Co. 35
Hones, Charles A., Inc. 170
Hunt, C. B., & Son, Inc. 172
Hyatt Bearings Division, General Motors Corporation 68
Hydropress, Inc. 137

Industrial Brownhoist Corporation 130
International Nickel Co., Inc., The 46
Iron & Steel Products, Inc. 177

Joliet Wrought Washer Co. 164
Jones & Lamson Machine Co. 98
Jones & Laughlin Steel Corporation ... 13, 109

Kaiser Aluminum & Chemical Sales, Inc., Kaiser Chemicals Division 88
Kaiser Engineers, Division of Henry J. Kaiser Co. 6
Kewanee-Ross Corporation 54

Lamson & Sessions Co., The 119
Lee, K. O., Co. 172
Lincoln Electric Co., The 74
Luria Brothers & Co., Inc. 175

McKee, Arthur G., & Co. 115

Mac Dermid, Inc. 134
Mackintosh-Hemphill Co. 96, 97
Manross, F. N., & Sons Co., Division of Associated Spring Corporation 32
Marsam Steel Corporation 177
Marvellum Co., The 75
Master Products Co., The 176
May-Fran Engineering, Inc. 128, 129
Mesta Machine Co. 110
Metal Treating Institute 120
Midvale Co., The 107
Milwaukee Division of Associated Spring Corporation 32
Morgan Construction Co. 63
Mundt, Charles, & Sons 164

National Steel Corporation 26
New Britain Machine Co., The 30, 31
New Departure, Division of General Motors . 71
Newport Steel Corporation 153
Niagara Blower Co. 12
Nice Ball Bearing Co. 168
Norton Co. 29

Ohio Division of Associated Spring Corporation 32
Ohio Gear Co., The 165
Ohio Steel Foundry Co., The 76

Pennsylvania Flexible Metallic Tubing Co., Inc. 39
Phillips Petroleum Co. 2
Pittsburgh Crushed Steel Co. 173

Ransburg Electro-Coating Corporation 92
Raymond Manufacturing Co., Division of Associated Spring Corporation 32
Reading Crane & Hoist Corporation 178
Republic Steel Corporation, Bolt & Nut Division 24
Republic Steel Corporation, Union Drawn Steel Division 112, 113
Rockwell Spring & Axle Co., Standard Steel Spring Division 161
Roebling's John A., Sons Corporation, A Subsidiary of The Colorado Fuel & Iron Corporation 37

Sciaky Bros., Inc. 82
Seaboard Coil Spring Division of Associated Spring Corporation 32
Seaboard Screw Corporation 168
Service Steel 170
Stamco, Inc. 170
Standard Oil Co. (Indiana) 15
Standard Steel Spring Division, Rockwell Spring & Axle Co. 161
Standard Steel Works Division, Baldwin-Lima-Hamilton 87
Steel Shot & Grit Co. 173
Superior Tube Co. 79

Timken Roller Bearing Co., The, Steel & Tube Division 72
Torrington Co., The, Swager Department 42
Townsend Co. 122, 123

Union Drawn Steel Division, Republic Steel Corporation 112, 113
Upson-Walton Co., The 179

Victor Saw Works, Inc. 16

Washburn Wire Co. 34
Wean Engineering Co., Inc., The .... Back Cover
Weirton Steel Co. 26
Wickwire Spencer Steel Division of The Colorado Fuel & Iron Corporation 81

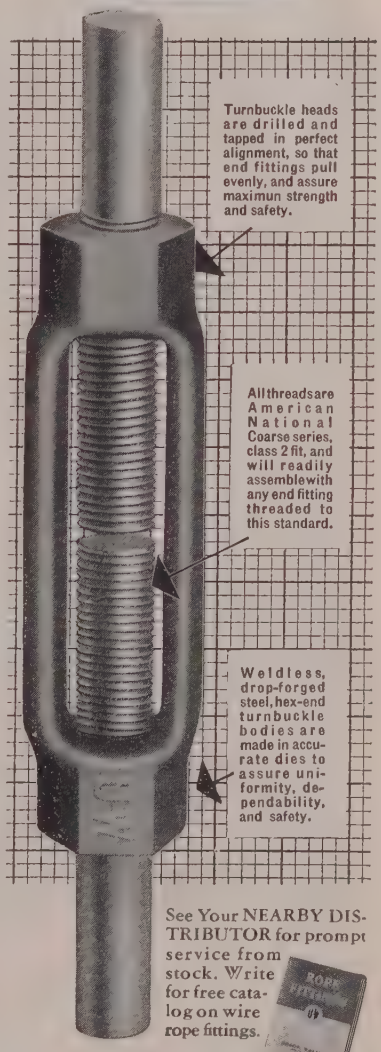
Yale & Towne Mfg. Co., The 125
Yoder Co., The 38
Youngstown Sheet & Tube Co., The 22

Table of Contents, Page 5

Classified Advertising, Page 177

UPSON-WALTON turnbuckles

ENGINEERED FOR SAFETY


Turnbuckle heads are drilled and tapped in perfect alignment, so that end fittings pull evenly, and assure maximun strength and safety.
Allthreadsare American National Coarse series, class 2 fit, and will readily assemblewith any end fitting threaded to this standard.
Weldless, drop-forged steel, hex-end turnbuckle bodies are made in accurate dies to assure uniformity, dependability, and safety.

See Your NEARBY DISTRIBUTOR for prompt service from stock. Write for free catalog on wire rope fittings.

THE UPSON-WALTON CO.

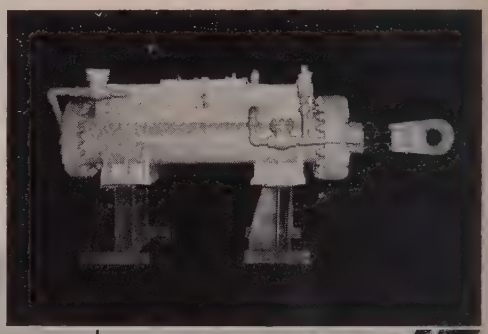
12500 ELMWOOD AVENUE
CLEVELAND 11, OHIO
New York • Chicago • Pittsburgh

YOU CAN DEPEND ON UPSON-WALTON'S LONG EXPERIENCE—ESTABLISHED 1871

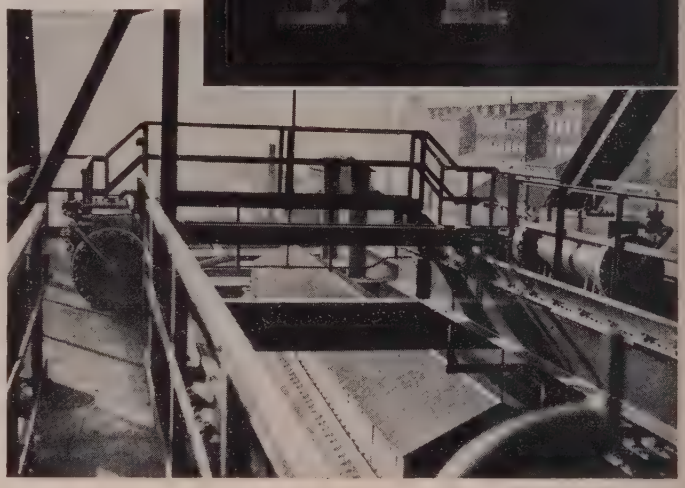
Manufacturers of ALL THREE
FITTINGS • WIRE ROPE • TACKLE BLOCKS

Now — DRAVO HYDRAULIC BUFFERS give safe stops on equipment runways

New hydraulic buffers, assuring positive, safe deceleration for all types of traveling equipment, have been developed by Dravo Corporation. In the event of braking failures due to mechanical or electrical reasons, or slippery rails caused by bad weather, the hydraulic buffer acts as an auxiliary brake and eliminates the possibility of severe damage to personnel and equipment plus the resulting repair costs and plant tie-ups.

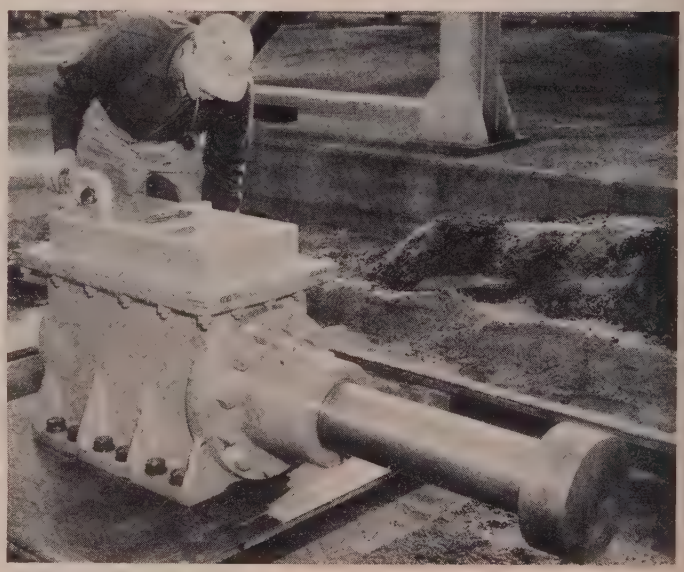


the DRAVO six-foot-stroke Hydraulic Buffer →



An eastern steel producer installed this pull-type buffer on a 15-ton ore bridge where the 215,000-lb (loaded) man trolley has a top speed of 900 fpm. The trolley strikes a buffer beam connected to the twin buffers and is brought safely and smoothly to a complete stop within six feet. The buffers reset automatically when the trolley travel is reversed.

the DRAVO two-foot-stroke Hydraulic Buffer →



A midwest steel producer needed a smaller, lighter buffer because of space and weight considerations. Dravo designed a two-foot, push-type, direct-contact buffer to meet the requirements of this installation and to produce a safe, although more sudden, stop. A spring reset is used on this buffer.

If your operations are subject to costly accidents due to the need for safe stops of traveling equipment such as man trolleys, overhead cranes, cars, etc., get in touch with Dravo for complete information on the new hydraulic buffers.

DRAVO
CORPORATION
Neville Island, Pittsburgh 25, Penna.

8 out of 10 machine tool users want Centralized Lubricating Systems

Studies in Centralized Lubrication
No. 153

83% of the executives questioned in a recently published survey of 14,334 metalworking plants demand centralized lubrication of machine tools. 37% prefer hand-operated systems; 58% said they want fully automatic lubrication. Farval offers both types of centralized systems that these machine tool users know, use and prefer.

Farval pays big dividends

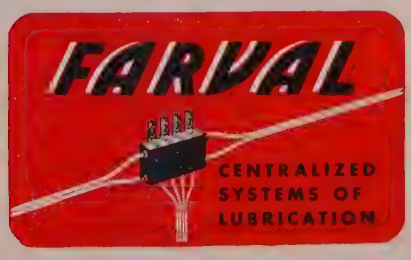
Farval Centralized Lubrication of industrial equipment has been saving money, man hours and operating expense for more than 25 years . . . "Spent $900 for Farval, saved $4,420" . . . "$7,500 invested in Farval earned us $389,640" . . . "Farval saved us $537,591 in 15 years" . . . Such reports are typical of the thousands given us by executives who have long since discovered that small investments in Farval save thousands of dollars in maintenance, production time and lubrication expense.

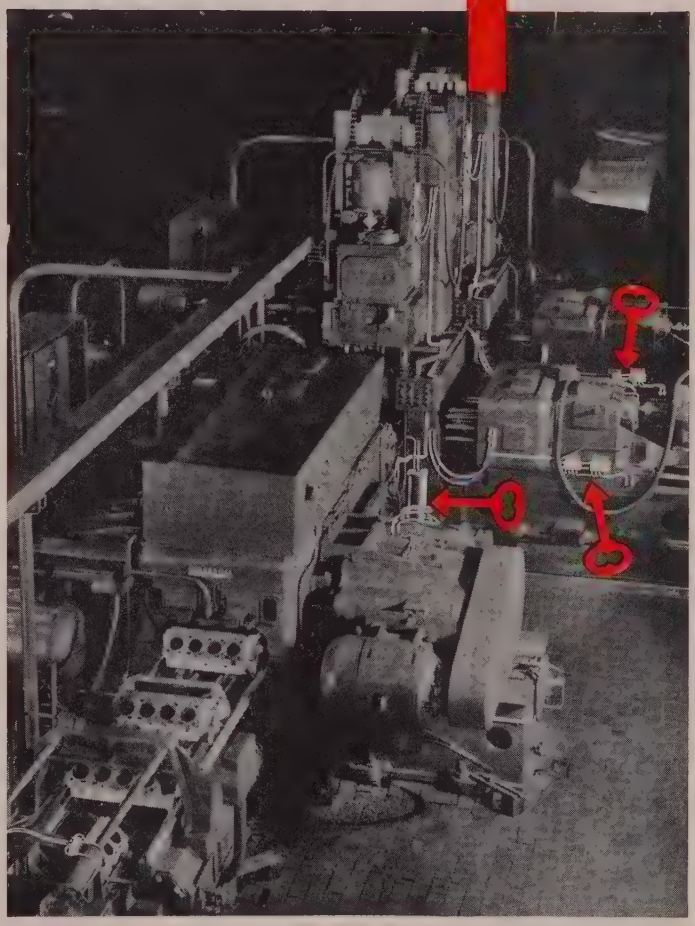
FARVAL is the Dualine system of centralized lubrication that hydraulically delivers oil or grease, exactly measured, to each individual bearing as often as desired.

Free Lubrication Survey

Why not let us send one of our lubrication engineers to inspect your plant equipment? Without obligation, he will present a written analysis of what Farval can do for you. Write also for Bulletin 26 for the complete Farval story. The Farval Corporation, 3270 East 80th St., Cleveland 4, Ohio.

Farval is an affiliate of The Cleveland Worm & Gear Co. Represented in Canada by Peacock Brothers, Limited.



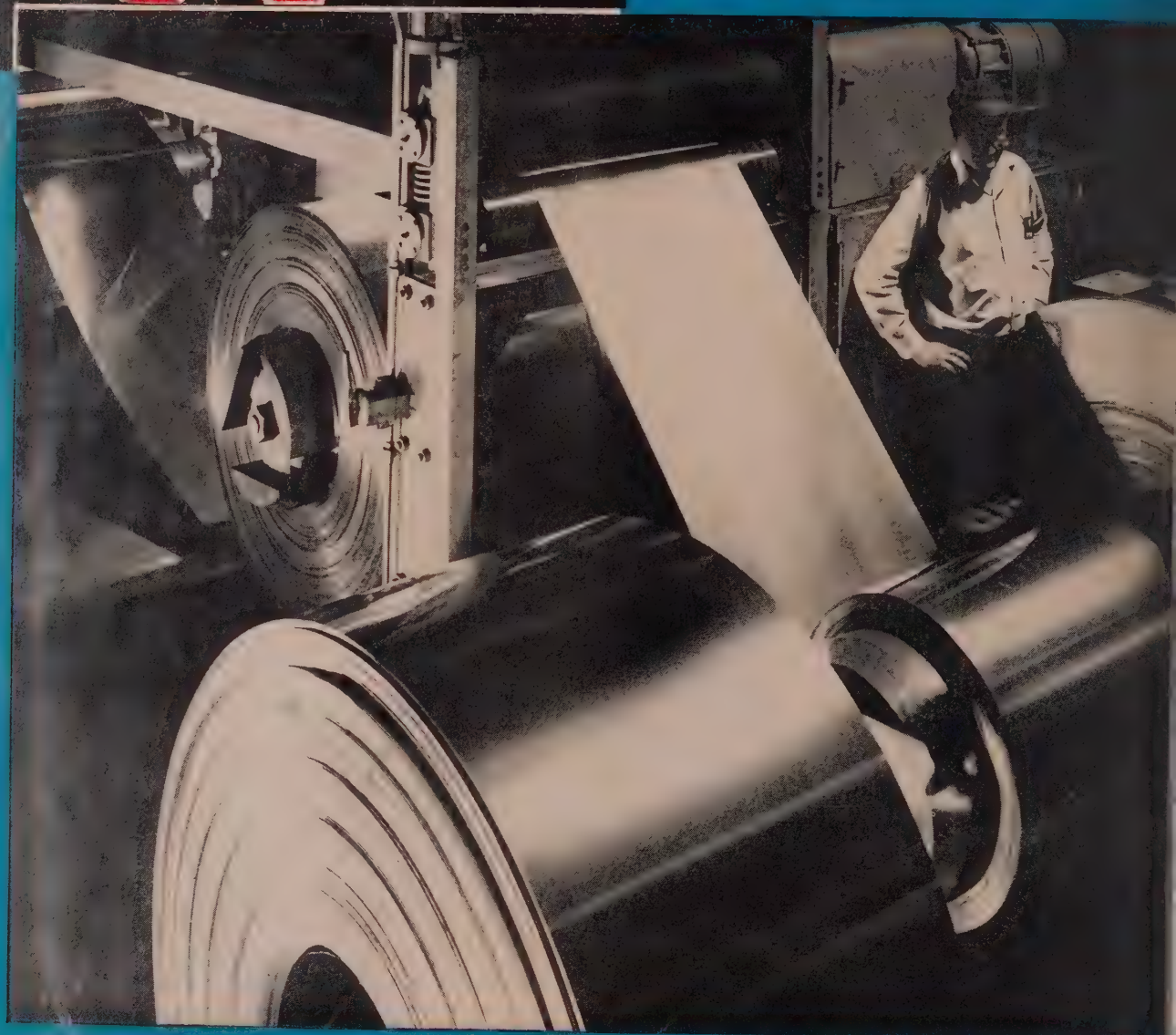


KEYS TO ADEQUATE LUBRICATION— Wherever you see the sign of Farval—the familiar valve manifolds, dual lubricant lines and central pumping station — you know a machine is being properly lubricated. Farval manually operated and automatic systems protect millions of industrial bearings.

Photo shows a Farval-equipped Ingersoll cylinder block process line in a well-known automobile manufacturing plant — typical of *Farvalized* machine tools throughout the country. Courtesy of The Ingersoll Milling Machine Co.

WEAN

ENGINEERING
Company, Inc.
WARREN, OHIO



The Wean Engineering Company, Inc., Warren, Ohio is a recognized specialist in the design and installation of sheet, tin and strip mill equipment. The expert knowledge and trained imagination of one of the world's most noted steel mill engineering firms is at your service when you specify Wean—whether the job calls for a single piece of equipment or a complete design of an entire line.

SPECIALISTS IN SHEET, TIN and STRIP MILL EQUIPMENT